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JUNE 5, 1937

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ELECTRICAL WORLD

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Chicago Is Host to Industry's Annual Convention June 1-4

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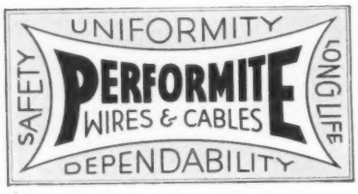

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ELECTRICAL WORLD

JUNE 5, 1937

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The Look-Ahead Spirit

A new spirit of optimism, vision, courage and industry co-operation was in evidence this week at the annual convention of the Edison Electric Institute. It was a convention of a reborn industry that is throwing off the discouragement that arose from repeated attacks by an unfriendly government. Not only was the attendance of close to 2,000 the largest since the Institute was organized five years ago, but the speakers found an audience extremely receptive to suggestion for the progressive development of electric utility service.

The most impressive thing about the convention was the spirit of "look ahead." In load building, in system planning, in customer and public relations, in opportunity for youth in the industry, in standards and co-operation, in research and safety, in basic considerations from the standpoint of economics, finance, social progress, liberalism—all were looking forward, toward a future based not upon any expediency of the moment but on sound expansion for years to come.

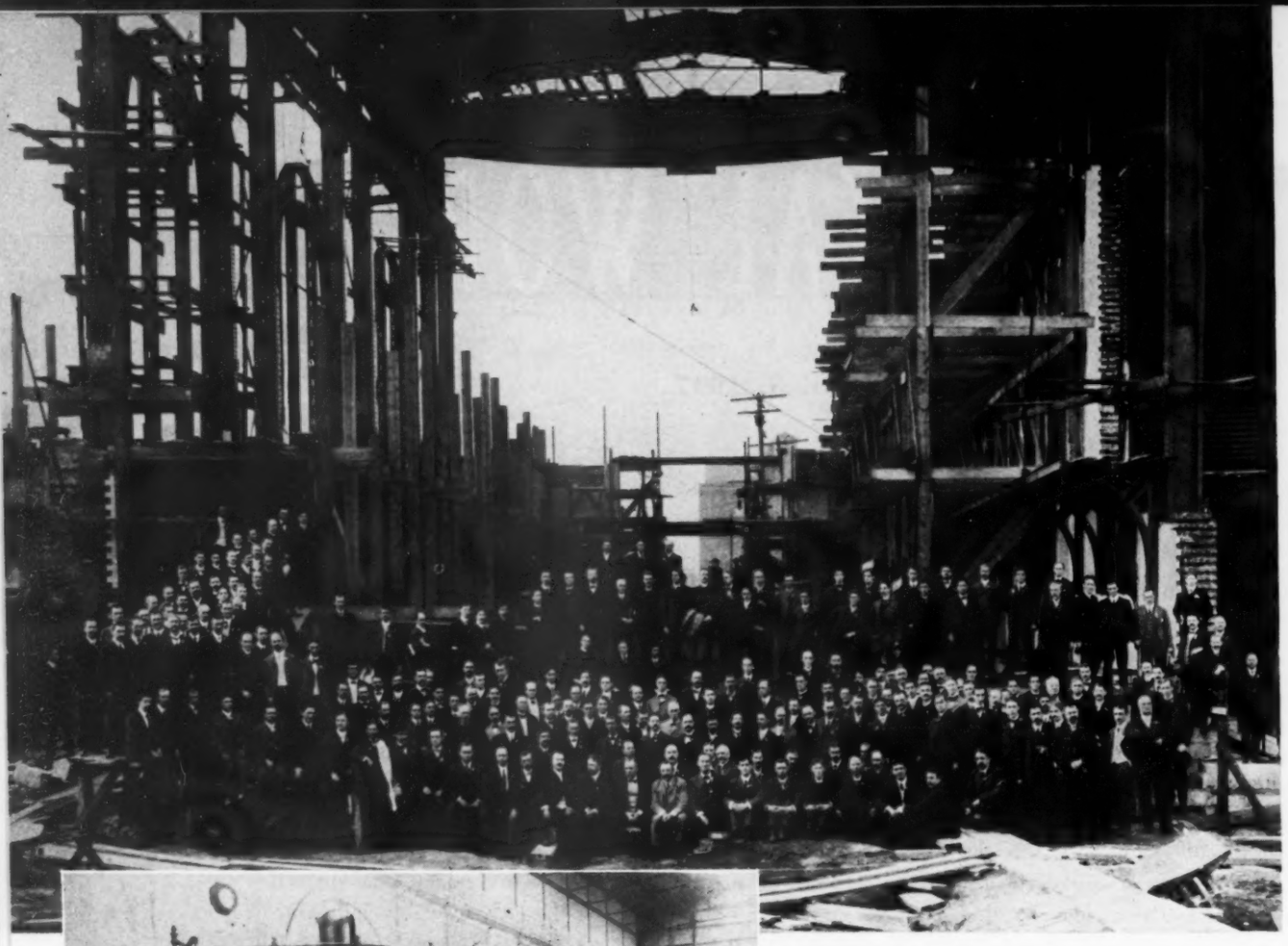
Commercial emphasis was placed upon residential load building with a recognition of the necessity for co-operation between all groups of the electrical industry. Should the suggestion be widely accepted that the same technique of developing the home market be applied by the entire industry, namely, that of selling complete electrical installations, it is not inconceivable that the term electrical standard of living might become synonymous for the American standard of living.

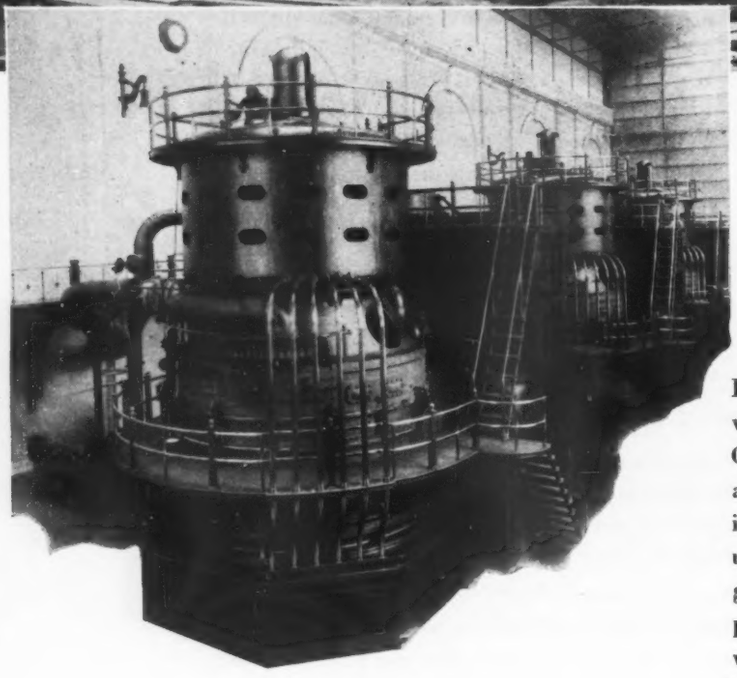
A new light was turned upon interconnection and its relation to system planning. Many interconnections that were turned down in the past as being uneconomical may under the changing conditions of today prove to be of real value. Nor is it only the economic and emergency values of interconnection that should be kept in mind, for there is always the possibility that the authority of government existing in our present body of law may make interconnection a mandate upon the electric utility industry.

One of the stumbling blocks to harmony within the electrical industry has been the regulation of wiring through the National Electrical Code, local legislation and standardization and testing of materials and devices. An acknowledgment of mutuality of interest between the manufacturers and the utilities was recognized at the convention by representatives of both interests.

Surely this can be interpreted as the first step toward co-operation between the two groups in determining the mutually acceptable principles upon which they and the other groups in the industry can go forward as a unit. The improved inter-industry relations that will come from such co-operation will have a beneficial effect upon many other but non-related industry programs.

Undoubtedly the optimism of the convention reflected to a large degree the recovery of business volume in this country, but there seemed something more that was of much greater moment. It was a rebirth of confidence, of vision and a determination of the industry to let nothing prevent it from moving forward. It would almost seem as though it had taken its cue from the philosophy of the stage, that, come what may—*the show must go on.*





THIRD OF A CENTURY OF TURBO-GENERATION PROGRESS

In the summer of 1903 the N.E.L.A. convention viewed in the rising Fisk Street station in Chicago the doom of the reciprocating engine and the birth of the turbine era. The astounding innovation was to comprise three 5,000-kw. units. In succeeding years its capacity was greatly increased, and for a long time it was the principal power producer of the Commonwealth Edison Company. Since eclipsed by Crawford, State Line, Waukegan and Powerton, the historic Fisk Street station now follows the trend toward rejuvenation of the older and more centrally located stations. A topping turbine of 30,000 kw. is now being erected for 1,200-lb. operation, exhausting at 250 lb. into two turbines totaling 60,000 kw. The station may ultimately ascend to 450,000 kw.

With the E.E.I. at Chicago

Future Progress of the Utility Industry Discussed by Outstanding Leaders Before the Largest Attendance in E.E.I. Annals

"THE fifth annual convention of the Edison Electric Institute will now be in order," said President C. W. Kellogg to nearly one thousand assembled members of the Institute as, at 2:39 p.m., June 1, 1937, his gavel marked the opening of the national convention at Chicago.

Immediately the presiding officer called upon E. J. Doyle, president Commonwealth Edison Company and chairman of the Chicago reception committee. To delegates who faced 95 degrees of heat the day before the convention and a 25-degree drop the day the convention opened, Mr. Doyle gave the word that for Chicago the weather was "unusual." Continuing, Mr. Doyle said: "There has never been a time in the history of the industry when there was a greater need for load building. In Chicago, for example, the time has seemed opportune to promote the electric range."

This comment of the host chairman indicated one major theme of the convention, beginning with the first speaker, Walter A. Forbush of Brockton, whose topic was "Progress Toward Electric Homes in Conservative New England."

"In 1924," Mr. Forbush said, "any new home or home being improved was asked to install three No. 8 wires," and at this early date, in the words of Mr. Forbush, "some of our utility neighbors thought we were crazy."

In 1917 the company offered to finance wiring. in 1926 this conservative New England company started to merchandise bucket cookers, and as early as 1930 it was surveying the effect of loads upon existing systems.

District representative plans, employee sales programs, early premium campaigns involving toasters and irons, dealer co-operation plans, the important place of the utility in such plans as a promotional agency were among the sales aids discussed by Mr. Forbush as a means of "preparing the soil" for continued sales effort.

C. W. Kellogg, Engineers Public Service and President E.E.I., and D. M. DeBard, Engineers Public Service

Water heating, air conditioning, better light—better sight and their related national campaigns are important parts of the company's sales activities, and these in turn are augmented by periodic sales campaigns which even bring in the employees' wives, the speaker said.

No panaceas are claimed or looked for, said Mr. Forbush, for cordial community relations, really co-operative dealer relations, sound promotional rate structure, sales programs built from the ground up and consistent use of the best sales methods will be the means of installing electric homes in New England.

Fatigue standards urged

"The average human being has very little knowledge of what a foot-candle is and he really doesn't care very much," said the next speaker, Dr. Morris Fishbein, editor *The Journal of the American Medical Association*, "although the eye is one of the most interesting of organs to human beings."

The "factors of safety" of the human body are matters of greatest importance, said Dr. Fishbein, and the eye has a tremendous résumé of them.

Messrs. E. O. Shreve, Gerard Swope and W. O. Bachellor, executives of General Electric

Twenty-five years ago the American Medical Association looked over the records hoping to find out about light and vision, said the speaker. Now there is still a great deal of talk of "good light," but only recently have experiments been made to define the right kind of light. The new conditions today in working and living quarters, the high speed which characterizes them and the importance of visual fatigue as a major cause of industrial accidents were mentioned as points which must be weighed in plans to improve modern lighting technique.

Home economists prefer selling duties

The reasons for converting home economists selling only service into home advisers selling practically all appliances except ranges and water heaters were the subject of the talk by the next speaker, Miss Nancy Finch, director of home service, Utah Power & Light Company, Salt Lake City.

Her subject, "What Women Can Do to Increase the Use of Electric Service," embraced an analysis of the territory of the company totaling 52,000 square miles, the habits of the customers and the effect of this analysis upon the development of the home economists' organization.

The better entree of the home service adviser to the home of the customer assists the salesmen in developing prospects and closing sales. Still, said Miss Finch, the girls have attained an average E. A. R. of $274, an increase of 145 per cent, their merchandise sales are up 61 per cent, from $56 to $90, and the total cost of such sales (including salaries, cars, bonuses, demonstrations and supervision) has been dropped from $1.01 per dollar of E. A. R. to $0.50 per dollar of E. A. R.

The only drawback mentioned by Miss Finch was the cost of training the girls in all the broad phases of their work. This, however, is offset, it was said, by the fact that duplicate or unnecessary trips are reduced, and the girl produces more and earns more after the broad training.

Complete survey of air conditioning

After a spot news announcement embracing a utility, a TVA and PWA decision by the Supreme Court, Chairman Kellogg then introduced Earl W. Gray, Oklahoma Gas & Electric Company, Oklahoma City, who spoke on "Conditioned Air—Its Opportunities and Problems."

"Every new business brings with it opportunities for those who will accept them," said Mr. Gray. "Air conditioning brought to the electric utilities an opportunity to build their load beyond anything dreamed of and, what is equally important, gave them an opportunity to assist their customers in profiting from this development.

"A new business also brings problems," the speaker said, "and air conditioning has been no exception. Many of the problems have already solved themselves and I am confident that the others will be mastered if we keep our feet on the ground."

C. E. Stevens, Westinghouse, and P. B. Juhnke, Commonwealth Edison

Mr. Gray then proceeded to a very factual analysis of the utility viewpoint toward air conditioning today, predicated upon 490 installations, totaling 6,600 hp. in his own company.

Among the subjects he discussed were the part played in promotional work by the utility company, the extent to which engineering advice on installations is rendered, the specifications prepared for customers and cooperation of the company with dealers and distributors.

The manufacturers' problem, as viewed by Mr. Gray, centered in the difficulty they experience in securing satisfactory outlets. The development of these outlets away from a merchandising approach was commended and utility companies were urged to co-operate with manufacturers not only in this problem but also in the proper promotion and sale of all air-conditioning applications.

Scheduled on the program for the first session was a new film entitled "From Now On." However, Chairman Kellogg announced that this would be shown later in the week, and then adjourned the first session at 5 p.m.

H. M. Sawyer, American Gas & Electric; Walter H. Burke, Ebasco Services, and J. E. Davidson, Nebraska Power

Second Session

Suggested by Philip Sporn and moved by J. F. Owens, a motion that the Institute should set up a special committee to study the values to be derived from integrated interconnections between systems as a national program for the utility industry was carried without debate or any adverse

vote by the convention in its second session, Wednesday morning. In his paper Mr. Sporn had recited how interconnection as a means for capital and operating economies and for emergency services had quite been lost sight of in recent years since "topping" turbines had become the stylish thing in utility engineering circles. With the rapid integration of systems in the 20's interconnection was the general shibboleth, but interest receded as the skies got darker. Now, said Mr. Sporn, the time has come for a re-examination of interconnection possibilities in the light of the changed conditions of today. Furthermore, in the Public Utility Act of 1935 there is contained authorization to the Federal Power Commission to require interconnection and integration of utility systems in the public interest, and certainly it will be wiser for the industry to study and to realize the benefits of interconnection before it becomes a mandate determined, possibly, more by political than economic and operating considerations.

Electrical standard of living

Just as complete electrification is accepted as a required component feature in the design and equipment of factories and business places, so also, said C. E. Wilson, should it be accepted in the American home. To that end he suggested that the "Electrical Standard of Living" (the title of his paper) be sponsored by the utilities in co-ordinated local and national plans which would engage and serve the interests of all branches of the home-building industry, electrical, non-electrical and financial. He offered the idea of a series of prizes, local and national, to be held out to builders for the best embodiments of the electrical standard of living in home construction. Similarly, another group of prizes would be set up for the best applications of complete electrification in old homes.

If political harassing of the electric utilities is pursued to its inevitable result, there will not be very many opportunities for youth in the industry. But this gloomy view was vigorously disclaimed by H. P. Liversidge in his discussion of such opportunities. He stated his personal belief that the present situation of the utilities is only a temporary interruption of a sensible, long-term trend under the established principle of private ownership. Granting this, youth will find in the utility field opportunity not for great wealth or large salary, but for achievement and accomplishment. These opportunities are open in engineering, sales accounting and in all the multifarious activities of utility operation, open not only to those with professional education but as well to all intelligent, industrious young people.

J. D. Noyes, Detroit Edison; G. E. Miller, Cleveland Electric Illuminating, and W. S. Monroe, Sargent & Lundy

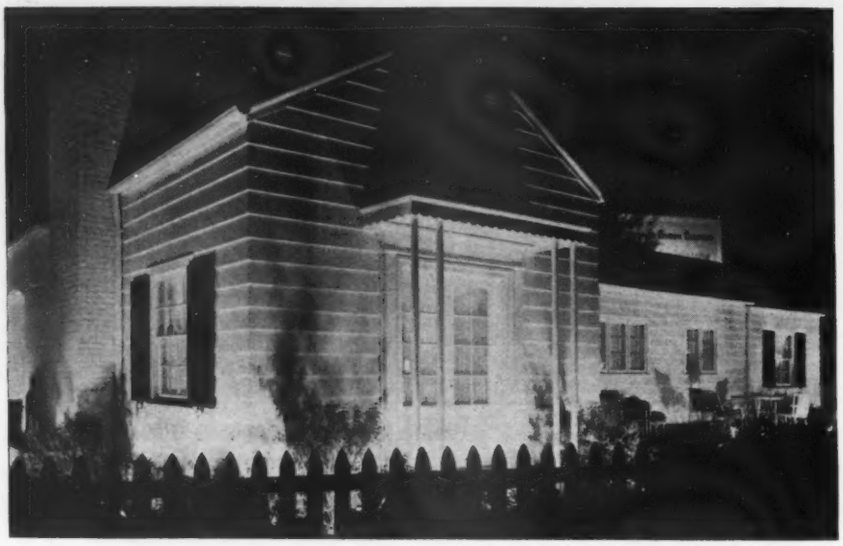
In the paper on the "Manufacturer's Stake in the Utility Business," by W. G. Symonds, and in its discussion by Edward T. Gushee appeared a clearer appreciation of the fundamental principles of co-operation between manufacturer and utility than, possibly, has ever been presented heretofore. Among the common problems facing the interests of both are the National Electrical Code, uniform ordinances and the policing of wiring methods. None of these, nor any other problems before the industry, are impossible of solution, given good will and understanding, and certainly it will be better for reasonable solutions to be found within the industry than for arbitrary actions to be taken by government agencies or political bureaus outside. With reference to the Code, Mr. Gushee presented a suggested program for action by all branches of the industry concerned so that differences that now exist may be reconciled and a Code worked out that will be mutually acceptable to all interested.

Third Session

The third session, on Wednesday afternoon, was presided over by J. G. Holtzclaw, vice-president of the Institute, and began with a talk on "Selling," by J. F. Porter, Jr., Kansas City Power & Light Company. Mr. Porter's talk related to utility selling of two kinds, selling merchandise and selling the company itself to customers. The speaker illustrated his points by two demonstrations on the platform, showing the wrong way and then the right way to sell an electric refrigerator.

The former involved a routine, haphazard patter recited in technical terms of interest to the seller, but not to the buyer. The latter method was

E. E. Potter and W. D. Cameron, General Electric, and A. D. Spencer, Detroit Edison



A new conception of a demonstration electric home designed for circulation, first shown to E.E.I. delegates, this Commonwealth Edison "Golden Anniversary" home will probably be visited by more than 300,000 people in the next six months

a description of the features of the refrigerator, expressed in the customer's language and devoted entirely to the benefits which the customer could expect to derive from her use of the refrigerator.

Mr. Porter's major point was that public relations depended to a very great degree upon each of the employees of a company and that it behooves management to make sure its own organization understands the company, its aims and its policies, and knows how to talk about them as the first step to good public relations.

The "Fourth Branch" of the Government was the subject of the next paper, presented by Bernard F. Weadock, vice-president and managing director, Edison Electric Institute. The term was borrowed from a report of President Roosevelt's Committee on Administrative Management, when it referred to the many government bureaus, agencies and boards as a "headless, fourth branch of the government."

Case after case was cited by the speaker, in an impressive array, of usurpation of judicial and legislative powers by these various agencies. Condemnation of this merger of three distinct powers was quoted from authorities in this country and abroad, together with the strong language employed by the President's committee in advising a separation and division of powers to restore liberty and freedom to the people.

H. G. Russell, Rochester Gas & Electric; F. J. Rutledge, United Gas Improvement, and John Kimball, Niagara-Hudson

"The Cost of Servicing Appliances" was the title of the next paper, presented by R. E. Fisher, vice-president of Pacific Gas & Electric Company, San Francisco. Particular attention was given to the discussion of the cost of servicing the electric range, as in this case, said the speaker, the costs are getting somewhat out of proportion to the value of the business.

Definite servicing responsibilities rest upon the manufacturer, the distributor, the dealer and the utility, said the speaker, and study of the problem by these participating groups should be made now so that the problem may be worked out to the satisfaction of the customer.

Servicing work may need to be redefined, Mr. Fisher added, by separating maintenance and repair work classifications from the true service work incumbent upon the utility company.

The part to be played by the dealer, the guarantees of manufacturers and what they really mean to the customer, especially the parts guarantee, and coordination of manufacturers' sales organizations with utilities' merchandise service organizations were among the points listed by Mr. Fisher as requiring early study in seeking the proper solution.

Whatever is done, the speaker concluded, the entire electric industry should recognize that the public must be served and that any changes will need to be introduced gradually so that customers will not become alarmed or inconvenienced.

New products from research

The closing presentation, by Dr. L. W. Chubb, director of Research Laboratories, Westinghouse Electric & Manufacturing Company, consisted of a demonstration of a new electric air cleaner and of polyphase light (several components of polarized light of different colors), and concluded with a survey of pioneer research.

The session closed with a presentation of a talking picture "From Now On," a new picture by General Electric Company, demonstrating major appliances and their use through the medium of a romantic play utilizing

G. C. Langdell, Commonwealth & Southern, and Fred C. Holtz, Sangamo Electric

some of the most popular of today's screen stars. Included in the list of "stars" appearing in the picture were a General Electric range, refrigerator and "electric pig."

Fourth Session

Enthusiasm reached its highest point in the fourth session of the convention with the address by W. C. Mullendore on "Liberalism and the Electric Industry." Basing his assertion that liberalism in its truest sense is an outstanding characteristic of the industry on the fact that the achievements of private initiative in electric service demonstrate its progressiveness, Mr. Mullendore exhorted utility people not to be so apologetic of alleged faults as to wear an appearance of shame in the face of attack. "Let us be respectful of authority," he advised, "but not so abjectly respectful that we fail to exercise our rights as citizens to insist that authority shall not be abused." The very argument that the politician advances most confidently as a reason for public ownership of electric utilities, the claim that so important a service as electricity should not be managed by private citizens, is itself an argument for the continuance of private management. For was it not private management that made electricity an essential service to the nation? And is it incongruous to argue that the men who accomplished this result are not now competent to administer the industry and carry it along to greater usefulness?

No electric utility company can afford not to have an adequate and effective safety program, and to be adequate and effective the program must be organized from the top down. This was the theme of the excellent paper by W. E. Mitchell. And safety includes more than the prevention of accidents. It reaches out to medical attention to employees and to the manifestation of interest in their economic affairs so that, being healthy and happy, they are safer workmen. Quoting Mr. Mitchell:

"I have attended a good many directors' meetings. I've heard many discussions of construction and expansion programs, always from the money side. Why are expenses so high? Will the dividend be earned? Seldom have I heard are we treating our employees right? Are we paying them enough? What do they think of the company? I believe it would pay the directors to think more about the employees—to learn what they are really thinking. It would be an excellent safety first measure. It might, like the annual medical examination, discover some latent ills that could be cured before they became fatal."

The great number of small operating utilities, that in the aggregate represent about 60 per cent of the whole industry and which depend almost entirely on parent holding companies for equity financing, may find themselves seriously crippled by an unsatisfied need for common stock money if the legal status of the so-called holding company law is not cleared up fairly soon. Practically all of the utility financing of recent years has been refunding. Soon new capital will be required and a definite proportion of it will have to come from the sale of stock. There will be little difficulty in this for the larger operating units, but the smaller will find the way not so smooth. These impressions come from the president's address of C. W. Kellogg. Government propaganda has magnified the power issue out of all proportion to its economic importance, declared Mr. Kellogg. Speaking in sharp denial of charges aimed at the electric utilities by federal agencies, he pointed out that the electric bill is about 2 per cent of the average family budget, while taxes are about fourteen times the electric bill.

L. W. Warner, Public Service Company of Indiana, and E. J. Doyle, Commonwealth Edison

The "Status of Rural Electrification" was reported by H. J. Gallagher in the absence of D. E. Karn, the programmed speaker. Creditable as have been the accomplishments of the private utilities in the extension of rural

J. F. Gilchrist, Commonwealth Edison; H. B. Gay, Electric Storage Battery, and W. W. Freeman, Columbia Gas & Electric

Fred T. Bensen, Mitchell Manufacturing Company; J. S. Lapp, Lapp Insulator Company, and N. D. Macdonald, Electrical Testing Laboratories

service, they have been the result of hit-or-miss efforts, unco-ordinated and sporadic. The present time seems to offer, said Mr. Gallagher, an excellent opportunity to capitalize on past experiences in presenting a united front by establishing, as early as possible, a national rural electrification policy for the electric utilities. Some of the problems that should be treated in the development of such a policy are rights of adjacent utilities in extensions of lines into unserved territory, wholesale rates to co-operatives, purchasing power of prospective farm customers, standardization of line construction, load building and methods for education in farm uses of electricity.

Dyer sees bright future

Belief that the future holds a bright outlook for the utilities was expressed at the banquet by Dr. Gus W. Dyer of Vanderbilt University. He said that the American people are still aware of the sad plight of the railroads when they were operated by the government and are not likely to allow the same thing to happen to the utility industry. Skepticism as to the wisdom of the government's policy of insuring every one a comfortable living, regardless of whether it was earned by work or not, was expressed by Dr. Dyer. He saw deterioration of the nation resulting from such a policy.

"For the first time in history," he said, "this country has come out of a depression with ten million unemployed and over a fifth as many receiving government relief. In past depressions it was business which led the way out, without an unemployment problem, and which carried the country to greater prosperity. This was done without the government leading the way." The advancement achieved in America has been through business leadership without government interference and multiplicity of control, he said.

Commonwealth Edison Drum and Bugle Corps rendered several selections as a finale.

The fifth session, on Friday morning, opened with the presentation of a paper (see page 82) "Some Engineering Contributions to Society," by R. C. Muir, General Electric Company, Schenectady, followed by a paper (see page 83) by Dean John T. Madden, New York University, on the subject "The Electric Industry Re-examined."

President Kellogg then made the presentation of the Coffin Award to the Consolidated Edison Company of New York, a facsimile of which is shown on page 81.

Frank W. Smith, Consolidated Edison Company of New York, then made the announcement of prize winners, and names are listed on page 67.

Prize awards committee announced the establishment of a new award to be known as the R. B. Marshall Award, offered through the courtesy of R. B. Marshall, president of Electromaster, Inc. This award provides for five prizes of $100 each for individual achievement in electric range sales over a twelve-month period. Details of the award will be announced later.

The entertainment of those attending the convention was in the capable hands of the Chicago reception committee, consisting of Edward J. Doyle, chairman; John F. Gilchrist, vice-chairman; Charles W. Bradley, William Chamberlain, A. G. de Clercq, B. J. Denman, Harry B. Gear, Robert J. Graf, Julius L. Hecht, Col. H. R. James, George R. Jones, E. W. Lloyd, B. W. Lynch, C. S. McCain and Purcell L. Smith.

The convention arrangements committee comprised Edward P. Johnson, chairman; H. T. Anderson, W. H. Childs, John W. Evers, Jr., Louis A. Ferguson, Jr., Gardner S. Howland, P. B. Juhnke, E. J. Lavin, C. A. Lind, Miss Helen Norris, R. R. Pilkington, J. F. Rice, W. R. White and Harold Wright.

Receiving with President and Mrs. C. W. Kellogg at the president's reception Tuesday evening were Vice-President and Mrs. Paul M. Downing, Vice-President and Mrs. A. H. Kehoe, Vice-President and Mrs. J. E. Davidson and Vice-President and Managing Director Bernard F. Weadock.

Ladies attending the convention were treated to a round of entertainment consisting of dances, receptions and entertainment, with luncheons and card parties at the Edgewater Beach Hotel and a tea and fashion show at the famous store of Marshall Field & Company.

Each day a printed list of registered delegates was prepared and distributed through the courtesy of ELECTRICAL WORLD.

"IS THIS WHERE YOU REGISTER?"

Close to 2,000 registered at the largest E.E.I. convention

The State of the Industry

An Analysis of the Past Year's Growth, Problems of Financing, Holding Company Act, Developments in Accounting Requirements, Engineering and Sales, With Comments on Wiring Regulation, Rural Electrification, Government Competition and Local Relations

By C. W. KELLOGG *
President of the Edison Electric Institute

THE electric utility industry is now serving 26,400,000 customers, a gain of about 810,000 over the preceding year. Output for the past twelve months was about 111,300,000,000 kw.-hr., which is 15 per cent above the previous twelve-month period. In the important matter of electricity in the home, average annual consumption per residence now stands at 755 kw.-hr., which is 63 kw.-hr. larger than the year before, and the average residence rate for the twelve-month period just ended was 4.6 cents, thus continuing the steady decrease which the industry has shown for many years. Non-farm houses now receiving electricity total 21,050,000, a gain of 500,000 in the year.

In the field of rural electrification, the total farms electrified by our companies now stand at about 1,100,000 and the past twelve months shows about 100,000 new farms served from our lines. The federal government, through its Rural Electrification Administration, is now financing the building of a considerable number of rural lines and its latest bulletin reports that lines have been built, are under construction or in the stage of getting bids to serve about 90,000 rural customers, farm and non-farm, and some already have electric service.

Contrasted with the 15 per cent gain in energy output, gross earnings have increased but 8 per cent, due to lower average rates, and operating income has gained but 5 per cent, on account of rising costs. Besides higher payroll and fuel costs, taxes have gone up 10 per cent, now representing 15 per cent of gross earnings and about equalling what our stockholders receive.

Increase in energy consumption has required additional power generating facilities. It is perhaps not generally realized that in the early years of the depression, when electric energy requirements were falling, the generating capacity continued to expand (4,300,000 kw. from 1929 to 1932) and it was largely on this extra capacity that the industry climbed out of the depression. Continued growth has naturally brought forth new generating plant development and capacity added since 1935, including that now under construction, amounts to 1,600,000 kw., which will bring the total installed capacity of the industry, after correcting for capacity retired from service, to over 35,000,000 kw.

Financing in the past year has been affected by the cheap money market as to bonds and, in the future, for many companies equity financing will be affected by what transpires under the Holding Company Act. In fourteen months ended in April, 1936, $1,500,000,000 of bonds had been sold by the electric utilities almost entirely for refunding at a lower coupon rate. Since then the sale of bonds for refunding has brought the total to $2,641,000,000 for the 26-month period ended April, 1937. It is interesting to note that prior to September, 1936, less than one per cent of the financing was for raising new capital and the vast majority was for refunding. Since September, 1936, new capital has accounted for 5 per cent of total bond financing. The sale of preferred stocks during the past year has been relatively small, amounting to about $127,000,000, of which 2 per cent was for new capital. Common stock financing has been negligible.

Construction expenditures for 1937 are estimated at $475,000,000, compared with $290,000,000 for 1936. As usual, the major portion of this year's expenditure will be for distribution facilities, generating facilities representing less than a quarter of the total.

Construction resumed

During the depression construction requirements were so small that they could, by and large, be met by the current reserve funds of the companies without resorting to security issues. With the resumption of normal growth, however, further capital issues will be required and electric companies will then be faced with the necessity for raising equity money to support additional issues of bonds. For the larger operating companies this should present no serious difficulty, but the same cannot be said for the smaller companies in the holding company systems, which depend

* Address delivered at E.E.I. convention.

entirely on holding company support for equity financing and which represent in the aggregate 60 per cent of the electric utility business of the country. These latter may be unable to raise equity money in any substantial amounts by sale of securities until the holding company status is cleared up.

The Holding Company Act

The constitutionality of the Holding Company Act is still undetermined by the courts. The government, after using as the basis for quashing other litigation on the subject the claim that the mandatory injunction against the Electric Bond & Share Company would settle all questions raised in the other litigation, then proceeded to narrow its own case down to the separability of Sections 3 and 4 of the act, so that final determination of that case may still leave the constitutionality of the act unsettled. Even if the act is finally declared to be constitutional, that would still leave unsettled the question of the real justice or practicability of the dissolution provisions of Section 11. Under this section the continuation or partial dissolution of a holding company system is made to revolve around the matter of integration; yet if integration, which we all recognize as desirable, is carried out between two companies of diverse ownership, dissolution may result, but if of similar ownership, no penalty follows. Not only is this arrangement illogical in itself, but it could easily result in one company, which had been practising the abuses prohibited in the act, still being allowed to exist, while another, entirely free of such abuses, might be forced into partial dissolution. The arrangement also flouts the greater stability conferred upon any investment by diversity as to location.

Accounting developments

During the past year the National Association of Railroad and Utilities Commissioners adopted a revised uniform system of accounts and the Federal Power Commission adopted a classification of accounts closely conforming thereto. The system is more elaborate and costly than the uniform classification of accounts it was designed to replace and it contains several important departures therefrom. At the present time nine states have adopted the new classification of accounts and eight states have made its use permissive.

Since the adoption of the new system of accounts, representatives of the Institute have conferred with the accounting committee of the National Association of Railroad and Utilities Commissioners on the important matter of defining units of property for accounting purposes, and they have been invited to attend another conference to be held later this month to consider the question of annual report forms.

Engineering and sales

Engineering developments of the past year have been of a striking although not revolutionary nature; this is inevitable with the long history of intensive development in the past. Probably the most interesting item is the installation of "topping" turbines in existing generating plants. These machines, operating at pressures and temperatures corresponding with the best modern practise, exhaust into the steam mains of the existing stations, thus giving the combined station the full extent of modern economy and getting the increase in station capacity at less than average unit costs for a new plant. The whole process represents a most significant economical saving to both investor and consumer by avoiding at a stroke what might otherwise have gradually become a serious obsolescence problem. Further progress has also been made in high-speed relay operations and lightning protection, having the effect of more continuous service and saving investment in reserve lines.

Sales effort has continued unabated and has produced excellent results. The sales activity has been guided and stimulated by committee subdivision into the principal fields of activity, such as refrigeration, ranges, water heaters, Better Light-Better Sight, and kitchen modernization in the residence field; and special study has been given to commercial and industrial possibilities. More electric water heaters were sold in 1936 then in the previous four years, and with respect to refrigerators, whose sales last year were about 2,000,000, we find the first quarter of 1937 exceeding the same period in 1936 by 38 per cent.

While naturally the domestic customer has received the greatest interest during the past year, due to far outnumbering all other classes of consumers, the commercial and industrial fields have by no means been neglected, the former having shown 16 per cent and the latter 17 per cent increase in sales over the preceding year. In the commercial field, air conditioning has shown remarkable growth, but due to poor load factor it is not altogether proving a desirable load to serve. The demand for this service is real, however, and our industry, in conjunction with the manufacturers, must grapple with the problems arising from this use for electricity to work out, in the course of time, the best answers to them.

In all this multifarious sales activity the manufactures and dealers have played a large part.

Rural electrification

The great extension of lines into rural areas in recent years presents a special sales problem, for it is only by building up the load on such lines that they can be made profitable both to the farmer and to the utility. The federal government, through the Rural Electrification Administration, has tried to make it appear that the utilities have endeavored to prevent the extension of electric service to the farms. You all know from experience that the exact reverse is the case—that the movement, conceived and inaugurated by the utilities themselves, is now at least fifteen years old as a specially recognized sales and distribution effort and much older than that as to specific areas. The difficulties faced in working out the problem have always been the basic economic ones of high distribution cost per farm, where settlement was sparse, and the low cash purchasing power of many farmers. Our industry has tackled the problem on two fronts; the effort to reduce line construction costs consistent with safety and the study of new ways in which electricity can be used effectively on farms. Distinct progress has been made with both of these matters during the past year. As evidence of progress in the latter respect, notwithstanding the fact that 100,000 new farm customers were added, the average annual use per farm customer during the year increased 75 kw.-hr.

The necessity for increasing the farm uses of electricity and improving the load factor of farm lines can scarcely be overemphasized. It is of the greatest importance both to the farmer and to the company. Otherwise, farm electric service cannot be made to pay its own way and in the long run, of course, it must do so if it is to be continued. It goes without

saying that if this is to be accomplished the increased use must be at rates sufficiently high to cover the cost of rendering farm service and pay a reasonable return on the necessary investment. It should not be at the expense of rate reductions disproportionate to the cost of service. Happily the farm uses of electricity are showing substantial progress and promise further advances in the future.

The REA program for rural electrification, which is calculated to extend power lines into still sparser farm territory than has yet been served, is clearly a subsidy from the taxpayer and should be frankly designated as such. The act as passed provided that the federal funds for rural electrification should not duplicate existing rural lines of private enterprise. Proposed amendments at this session of Congress would eliminate this restriction. It is to be hoped that the government promotion of rural electrification is not made a cloak for subsidized competition with unsubsidized investment of individual investors.

Government competition

This leads to the matter of government competition in the electric business. The subject naturally divides itself into two parts, municipal operation and federal government activity, although the two meet in the form of the WPA grants of 45 per cent of the construction cost as a donation by the federal government to any city desiring to compete with its local utility. The recently revised plan of the PWA is to donate only wages paid to workers taken from relief, plus 15 per cent. Since this means practically common labor, which is a relatively small part of power plant construction, the change is an important one.

In the field of municipal ownership the number of municipal electric plants established in this country in the four years ending 1936 was only 30, the smallest figure for any four-year period in the last fifty years. Also for the year 1936, out of 127 municipal elections involving a total population of 5,735,000 on the question of municipal ownership of electric utilities, only 49 elections involving 27 per cent of this population were favorable to municipal ownership. To have shown these results in the face of the most powerful propaganda machine the government ever produced is most gratifying. It should, however, not cause us mere elation, but a feeling of deep satisfaction that we have been able to give the people on the whole a service of whose quality and cost they can approve and should increase our determination to achieve even better results in the future.

As to the federal government, the production of electric power can legally be undertaken only as a by-product or incident of some legal federal function such as navigation improvement, flood control, irrigation, etc. In the case of the TVA the government's own figures show that three-quarters of the cost of the navigation dams on the Tennessee River arises solely from electric power. War Department figures show that power represents about 67 per cent of the total cost for the full development of the Bonneville plant on the Columbia River. The TVA so far has charged no part of its navigation dams to power, although in recent testimony before a Congressional committee the chairman of the TVA proposed to allocate to electric power 47½ per cent of the cost of Norris Dam, 49½ per cent of Joe Wheeler Dam and 45 per cent of the cost of Wilson Dam. If the TVA followed the facts in the allocation of costs, it would make the TVA hydro power cost two and one-half times as much as the same power could be made by steam, and the latter method would employ much more labor. Two questions naturally arise: (1) Whether the public would approve continuing to pour millions of its money into TVA if it knew the facts as to costs, and (2) whether the courts would find that something costing three-quarters of the total was truly a mere incident of the other quarter—whether the tail was wagging the dog.

The federal government's power policy has resulted in the production of far more power than is needed for public consumption in the areas adjacent to its dams. It has been attempted to justify this by a cry of "power shortage." When it is realized that 94 per cent of the electric energy of the nation is manufactured or sold by the privately owned electric utilities, and that for fifty years these utilities have been planning and building ahead of the public's needs, it naturally follows that the only way a power shortage could be produced would be for the utilities to cease to function as they have throughout their history. At the very time this "power shortage" propaganda was promulgated the industry had an excess over even normal reserve requirements of about 4,000,000 kw.

The federal government has placed in operation to date 164,000 kw. at Norris and Joe Wheeler Dams by the TVA and 370,000 kw. at Boulder Dam. It is reported that 86,400 kw. will be ready at Bonneville on the Columbia River near Portland by December. Eventual capacity of all federal plants built, building or definitely planned is 6,500,000 kw., and the cost $1,250,000,000. The new capacity from these plants will create a large surplus of power within transmission range, for they are removed from the heavy power-consuming centers of the nation. If to the initial cost were added the interest charges during construction and the cumulative deficit during the many years before revenues from the sale of power may be expected to equal operating expenses and fixed charges, the enormous cost to the taxpayer of these federal projects is even more apparent.

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Government propaganda has magnified the power issue out of all proportion to its relative economic importance. The electric bill is about 2 per cent of the average family budget, while taxes are about fourteen times as large an item. The cost of raw power is a relatively small part of the cost of service to the vast majority of customers; if power cost nothing, rates for the average household could be only slightly affected.

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Throughout this year I have been preaching the doctrine that, vast and detailed and ramified as our business may be in its combined physical and other aspects, its purpose is simple and its essence small. That purpose or reason for existence is solely to furnish the best possible electric service to the maximum number of people, for the broadest usefulness to them and at the lowest feasible cost. It follows from this basic purpose that the fundamental element from which this great aggregate results is the service to the individual customer. No spring can rise higher than its source and our standing as an industry dedicated to the public service depends entirely upon the relative integrity and general satisfactoriness of this elementary relationship between the local company and its individual customer.

The "Fourth Branch" of the Government

Agencies, Committees and Boards Found to Be Usurping Legislative and Judicial Powers — Eminent Authorities Suggest Remedies

By B. F. WEADOCK*
Vice-President and Managing Director Edison Electric Institute

THE Constitution of the United States was drafted to protect the citizens of the United States in their person, property and pursuit of happiness. It provided a simple government upon the basis that the best government was the one which governed least. The functions of American government were established in three branches; namely, legislative, executive and judicial. Lawyers, statesmen and publicists have concerned themselves with the present departure from the primary branches of government lest a despotism be created and perpetuated rivaling in extent the "star chamber" government of old. This concern is indeed grave, and principally because the arm of the "fourth branch" of government is constantly growing stronger and mightier; it extends beyond the commonly known regulated industries and into fields of industry and commerce heretofore declared to be private in nature. The electric light and power industry's views upon legal regulation are well known and need no defense.

A committee of the American Bar Association has exhaustively examined the subject and states that there are about 1,300 separate instances of transfer of power to enact laws from Congress to administrative agencies; that is, to the executive branch of the government and to independent boards and commissions having executive powers.

President Roosevelt, realizing existing conditions in the executive branch, appointed a committee to consider the problem of administrative management in the federal government. That committee has made its report. The committee found that there is now in the government of the United States more than 100 separately organized establishments and agencies presumably reporting to the President. Among them are the ten regular executive departments and the many boards, commissions, administrations, authorities, corporations and agencies which are under the President but not in a department. (Page 32, President's Committee on Administrative Management Report.) There are also a dozen agencies which are totally independent, creating, in the words of the committee, a new and "headless 'fourth branch' of the government." (Page 30 of the President's Committee Report). This "headless 'branch'" has authority over American industry, trade and commerce, as well as over individual citizens. When this "fourth branch" of government invades the powers of the primary branches of government it destroys individual constitutional rights. There are well-recognized and forceful objections to the further extension of the powers of administrative boards, commissions, administrations, authorities, corporations and agencies.

Legislative branch created as servant, not master

The legislative branch was created as a forum to consider and debate questions relating to the public welfare and to determine legislative policies and enactments. It was created as a representative of the people, not as master of the people. The legislation when enacted was intended to be in such form as to be readily available and in language easily understood by those required to obey the law. If the legislation is contrary to the principles of fundamental and sound government, we the people exercise our right to select new representatives.

Contrast this long-established legislative precedent with the legislation—and I use the term advisedly—adopted by administrative agencies. We find in these administrative agencies persons of strong bias, prejudice and zeal seemingly desirous to extend their powers and advance their theories and schemes without reference to the mandates of the legislative branch nor respect for interpretations of the judicial branch of the government. They assert the right to exercise arbitrary judgment upon the constitutional rights of those subject to their jurisdiction. In many instances they are the drafters of their own laws. They lobby them through Congress. They fortify themselves with omnibus clauses which are framed to confer almost absolute powers upon their respective commissions or bodies. They inevitably seek the right to control by "rule and regulation" the social, economic and industrial life of the people. As the stalwart Senator Burton K. Wheeler of Montana said in an address before the Tri-State Life Insurance Congress on March 20, 1930: "The demand for federal regulation will extend beyond the utility group, including transportation and communication, to chain stores, oil and banks, and nearly every line of big business." The Senator described the administrative agencies existing at that time as "a Babel of bureaucracy, a citadel of centralized government." (*U. S. Daily*, March 20, 1930).

Their rules and regulations, orders and pronouncements do not take the form of a uniform law and publicized as such, but in many instances may be found buried in the archives of their commission and remain unknown to the general public. These rules and regulations are, in reality, a borrowing of legislative function in order that by such rules and regulations they may "chisel" their peculiar policies and individual theories into law. If such policies and theories were known to the enacting body, it is questionable

* Abstract of E.E.I. convention paper.

whether such authority would ever be delegated. They evade judicial review and constitute themselves not only a court of inquiry, but also a court of final adjudication.

Supreme Court divests I.C.C. of assumed powers

An outstanding illustration of the exercise of legislative and judicial functions by administrative commissions is that of the Interstate Commerce Commission. It will be recalled that Congress enacted a law providing for recapturing certain earnings of the railroads. The Interstate Commerce Commission conducted a valuation of the railroads of the country and spent 20 years in time and over $200,000,000 in public money evaluating the property of the railroads, based upon fallacious theories, but theories desired by those formulating the policy. The commission sought to establish prudent investment as the basis for its valuation, and when the question of the exercise of the legislative and judicial power by the Interstate Commerce Commission reached the Supreme Court, the court, in refusing to adopt the theory of the commission, said:

> In the exercise of its proper function this court has declared the law of the land concerning valuations for rate-making purposes. The commission disregarded the approved rule and has thereby failed to discharge the definite duty imposed by Congress. Unfortunately, proper heed was denied the timely admonition of the minority—"The function of this commission is not to act as an arbiter in economics, but as an agency of Congress, to apply the law of the land to facts developed of record in matters committed by Congress to our jurisdiction." (St. Louis & O'Fallon Railway Company vs. United States, 279 U.S. 461-485, 487) (1929).

And yet, in the face of this severe condemnation by the United States Supreme Court, we find that the Federal Power Commission, the Federal Communications Commission, the Securities and Exchange Commission, the Federal Trade Commission and other innumerable bodies desire to inflict upon the electric industry, in one way or another, the original cost theory, the prudent investment theory or some other dogmatic or arbitrary theory of valuation inconsistent with and contrary to our established judicial doctrines.

Dilatory tactics

These boards, commissions, authorities and whatnot have restored to dilatory tactics to avoid judicial decisions upon the question of the validity of their actions and conduct. An outstanding illustration is found in the case of the Securities and Exchange Commission's suspending an act of Congress by a mere publicity release in order to prevent companies from bringing actions to enjoin the enforcement of the law. The pretense for this action, it is claimed, was to avoid a multiplicity of suits. The commission by Holding Company Act Publicity Release No. 22, issued November 22, 1935, said:

> In the meantime, at least for the immediate future, and until further notice, the commission does not intend to make any recommendations to or requests upon the Department of Justice for the institution of proceedings to enforce criminal liabilities under the act. The commission understands that the Attorney General has sent a circular to district attorneys setting forth the attitude of the Department of Justice.

The effect of this action was to prevent an early adjudication of the constitutionality of the holding company act and to oust the court and jury of their constitutional functions and leave the commission free to bring a hand-picked action of its own. There is no record to indicate Congressional approval of this confiscation of legislative and judicial power.

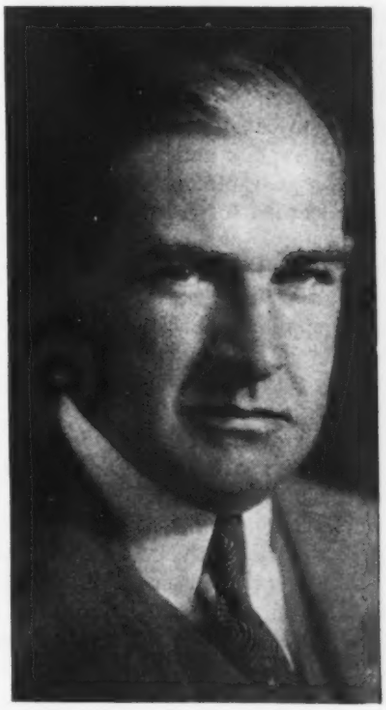
Judicial powers invaded

While the administrative bodies are confiscating legislative powers from legislators, it is likewise invading the powers reposed by the Constitution in the courts of the land. Constitutional safeguards are persistently disregarded. The administrative bodies constitute themselves a super court without any of the constitutional safeguards of the judiciary system.

The administrative commissions have caused alarm by their continued disregard of the legal rights of the "defendants" appearing before them. The administrative bodies constitute themselves informers, prosecutors, jury and sheriff to execute their orders. The manner of conducting investigations, examinations, inquiries, inquests and studies have demonstrated that the procedure followed is far from even a layman's notion of a fair trial by jury. There is no equality nor justice in the methods employed.

The presiding judge is an employee of the commission. He usually admits what the department desires in the record and excludes any explanation or facts inconsistent with the predetermined theory of the department. One is called to answer charges upon information which is in the custody of the department but not available to the defendant. Gossip, hearsay and even statements of dead men have been introduced in some commissions as proof of the existence of an alleged fact. In making records of cases, the presiding officer has ordered the stenographer to stop taking notes upon objections, arguments or factual presentations by defendants. Frequently off-the-record statements are made; namely, the statement is made but it never appears in print. The reports are prepared with great study to prevent any court review. The courts seldom review issue of fact determined by the administrative body. As is pointed out by the report of the special committee on administrative law of the American Bar Association, the courthouse doors are closed to trial by independent judges.

Other eminent authorities might be quoted, but it seems wholly unnecessary in view of the well known fact that these administrative agencies do what is desired by the executive, or if not, those in charge must seek other occupations. Accepting this theory; namely, that these commissions are subject to the coercive influence of the executive, results in reposing in the executive legislative and judicial powers never contemplated in our Constitution. The result of this is simply that our rights, our privileges, our liberties and our freedom are dependent upon the fluctuating political policy of the executive rather than the inalienable protection guaranteed to us by the Constitution.



The Cost of Servicing Appliances

Tremendous Sales of Household Equipment Introducing Problem of Large-Scale Servicing — Manufacturers, Dealers and Utilities Urged to Seek Satisfactory Solution to Problem

By R. E. FISHER *
Vice-President in Charge of Public Relations and Sales,
Pacific Gas & Electric Company, San Francisco

AS SATURATIONS of electric appliances increase there is developing a major problem of servicing, and a rather heavy burden is being placed on the electric utilities to a point where servicing costs to the utilities are getting somewhat out of proportion to the comparative value of the business. This is especially so in the case of the electric range.

Generally speaking, I think we can agree that the servicing of electrical appliances is primarily a responsibility of the manufacturers, especially since the guarantees originate with them. The dealer represents the manufacturer in performing the actual sale to the customer. In addition to his sales ability he should be selected because of his continued interest in the appliances after they are installed and operating. There is no doubt but what the manufacturer sets up a reasonable amount in the price of the appliance to take care of repairs and replacements during the guarantee period. Customers have learned to place a great deal of reliance upon the electric utility that is built upon service and naturally look to them in time of trouble. Therefore, when appliances break down, the customer, not knowing what the fault is, usually calls the electric utility, which, it seems, must act as the coordinator of all concerned. The utility is anxious to get the load back on the line; the manufacturer and distributors are of course anxious that their appliances give good service, and want faulty parts promptly replaced and the appliance put in good working order. The dealer who has sold the appliance should be very much concerned with

the proper and continuous performance of the appliance because many of his sales originate from a satisfied purchaser.

Therefore, it seems to us that all concerned should bear an equitable part of the cost of servicing. How this can be accomplished is another matter.

I would summarize the electric appliance servicing problem from the utilities' viewpoint as follows:

1. Let us recognize that the servicing of electric appliances as an industry problem involves definite responsibilities to the manufacturer, the seller of the appliances and the electric utility.

2. It is timely that an organized effort be made to study and possibly redefine the responsibilities of service by the various groups of the industry. Within the past few years conditions have warranted a change in the utilities' service policy on electric motors and in the domestic field we are, perhaps, in a transition status wherein certain domestic appliances are now generally serviced by dealers, and yet others, particularly electric ranges and water heaters, are still serviced primarily by the utility.

3. Study should also be given to a redefinition of servicing. One phase of this should be considered as maintenance and repair work, which should be logically the responsibility of the seller of appliances, whether dealer or utility. The other phase of servicing that could be clarified would be that work done by the utility strictly in the nature of servicing work, apart from maintenance and repair work.

4. The industry should recognize the trend in appliance sales from the viewpoint of appraising the extent to which dealers in any locality are becoming an increasingly important factor in the sale of various types of electric appliances. The maintenance repair phase of servicing work now rendered by utilities should be proportionately less as good dealers become increasingly active in the sale of appliances.

5. It is urged that manufacturers give further consideration as to the intent of certain guarantees that they offer the public on various types of appliances. Since the customer has every reason to expect that these guarantees will be fulfilled either as they apply to the new appliance or to replacement parts, it is obvious that the guarantee policy on the part of the manufacturer should be

*Abstract of E.E.I. convention paper.

correlated with the utility's and dealer's servicing policies. Particular attention should be directed to changing the parts guarantee, involving as it does considerable cost to maintain necessary records, replace parts and secure credit.

6. Office and field organization for receiving and executing service calls can well be studied. I am of the opinion that through education and centralization satisfactory results will repay for the efforts that have been expended.

7. The co-ordination through one source of manufacturers' agents, sales and service representatives with the various utilities' public relations, sales, operating, claims, purchasing, stores, and accounting departments on all matters of operation, construction, service, and procedure, would be of distinct benefit.

8. I have purposely refrained from quoting statistics that involve cost per appliance, cost per call, and total expense in relation to revenue.

9. Last, but not least, the electric industry should recognize that the public must be served. The privately-owned electric utility has, in the past, earned a reputation for good service, and with the co-operation of the manufacturer, distributor, and dealer, should maintain a service to its customers superior to that rendered by any publicly owned utility.

Edison Electric Institute Prize Awards

Charles A. Coffin Medal

Consolidated Edison Company of New York, Inc.

". . . for distinguished contribution to the development of electric light and power for the convenience of the customer and the benefit of the industry."

George A. Hughes Award

Utah Power & Light Company, Salt Lake City

". . . the greatest contribution to the development of domestic electric cookery load."

Augustus D. Curtis Award

New Orleans Public Service Incorporated, New Orleans, La.

". . . the greatest contribution to the advancement of artificial illumination of interiors or exteriors of commercial and public buildings."

Thomas W. Martin Award

Niagara, Lockport & Ontario Power Company, Buffalo, N. Y.

". . . for the greatest contribution to the advancement of rural electrification."

James H. McGraw Prizes

J. M. Mousson
Safe Harbor Water & Power Corporation, Baltimore, Md.

"Practical Aspects of Cavitation and Pitting"

Wallace C. Rudd
Consolidated Edison Company of New York, Inc.

"A New Method for Checking Instrument Transformer Connections to Watt-Hour Meters"

Anson D. Marston
Kansas City Power & Light Company, Kansas City, Mo.

"Energy Consumption by Air Conditioning Customers"

". . . for the three most meritorious papers on any engineering or technical subject relating to the Electric Light and Power Industry."

B. C. Forbes Prize

Clarence M. Kilian
Alabama Power Company, Birmingham, Ala.

"Public Relations—Lip Service Only?"

". . . for the most meritorious paper dealing with the subject of public relations in the Electric Light and Power Industry."

Honorable mention to E. R. Eberle, Public Service Electric & Gas Company; L. M. LaPorte and E. M. Wagner, Milwaukee Railway & Light Company; F. J. Porter and F. E. King, New York & Queens Electric Light & Power Company; Henry H. Carpenter, Blackstone Valley Gas & Electric Company.

H. M. Byllesby Prizes

H. O. Hussong
California Oregon Power Company, Medford

"Reasons for A Retirement Reserve"

L. M. LaPorte and E. M. Wagner
Milwaukee Railway & Light Company, Milwaukee, Wisc.

"Meter Reading Work a Function of Customer Accounting"

Neil E. Heikes
Public Service Company of Northern Illinois, Chicago

"The Problem of Debt Discount and Expense in Connection with Public Utility Bond Issues."

". . . for the three most meritorious papers on any accounting subject relating to the Electric Light and Power Industry"

A. L. Lindemann Prizes

Paul L. Meyers
Florida Power & Light Company, Bradenton, Fla.

R. L. Greene
Detroit Edison Company, Detroit, Mich.

George E. Kelley
Portland General Electric Company, Portland, Ore.

". . . for the three most meritorious papers dealing with the advantages of electric cookery for domestic purposes."

J. C. Jones, Sanderson & Porter, and F. A. Newton, Commonwealth & Southern

J. F. Owens and A. A. Brown, Oklahoma Gas & Electric

George Tidd, American Gas & Electric Company

C. E. Michel, Union Electric Light & Power; L. R. Parker, Commonwealth & Southern, and Julius Daniels, Boston Edison

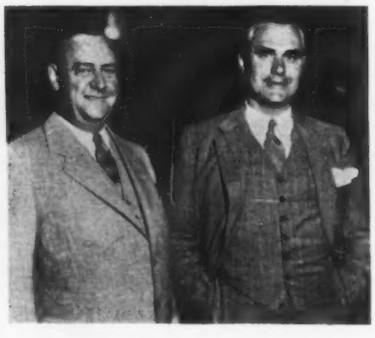
S. B. Tuell, Engineers Public Service; H. C. Leonard, Baton Rouge Electric, and T. J. Hanlon, Engineers Public Service

Tom C. Polk, Public Service of Indiana; E. J. Lavin and J. N. Walton, Commonwealth Edison

C. C. Curtis, Stone & Webster, and R. E. Hamilton, Engineers Public Service

J. P. Palmer and R. C. Muir, General Electric, and L. L. Crump, J. R. Kearney Corporation

L. G. Tighe and Sam Stites, Ohio Edison



Francis McQuillen, West Penn Power, and Frank Gaskill, Philadelphia Electric

Electrical Industry Characteristically Liberal

Accusation of Stand-pattism Falls Before the Record of Contributions Toward Social Betterment by Electric Utilities

By W. C. MULLENDORE *
Executive Vice-President Southern California Edison Company

TO MANY of us the word "liberal" is still a grand word, notwithstanding its recent appropriation by many who advocate a return to the autocracy and statism of the Dark Ages. There are great numbers who understand the term liberal in its proper use as being applied to those who fight for greater freedom for the individual, who welcome new ideas, who are independent in their opinions, and who are receptive to suggestions of new methods and processes which offer real improvement and progress. Thus understood, most of us would like to be known as liberals, and thus understood there is no group in America, industrial or otherwise, who have a better claim to the designation "liberal" than this group of which we are a part as members of this industry.

Unless I have seriously over-estimated the calibre of human material of which this industry is composed, neither that leadership nor our liberalism will be surrendered without much more of a struggle than has yet been witnessed.

Criteria of liberalism

What should be expected and required of an industry which lays claim to leadership in progressive contributions to the development and the welfare of the country it is a part? I believe few will dissent from the proposition that such a claim should be subjected to at least these basic tests:

First—Such an industry should provide a service or commodity which contributes to the advancement of the standard of living of the country as a whole.

Second—The progressiveness of the operators of the business should be demonstrated by continual improvement in their service and by a lowering of its cost so that it may be made available to an ever-increasing number of people.

Third—This business must be in the hands of people who are sensitive to their responsibility, who have enough imagination to foresee the public need, and enough resourcefulness to devise ways and means of meeting the increasing needs.

Fourth—Those who would successfully claim leadership in an American industry must have a sincere sense of stewardship and trusteeship which safeguards the public interest in their industry; they should furthermore exhibit a genuine willingness to cooperate with governmental authorities in making effective necessary regulation, and they should make available to the public full information from which the wisdom of their administration and the faithfulness of their stewardship may be adjudged.

We should ask only to be judged in our claims of liberalism and leadership by our ability to meet those tests, and we may here briefly refer to some of the evidence in support of our claims: Only a little more than half a century ago the possibilities of this little understood form of energy that is called electricity were practically unknown.

We have since succeeded in bringing our product and service in ever-increasing quantity and at ever-decreasing cost to a larger and larger section of the public. The use of electricity is today almost 25 times what it was 35 years ago, while its cost has in the same period decreased until it is now less than one-third that of 35 years ago. This remarkable reduction in cost has been achieved too in the face of such equally remarkable increase in charges upon the industry as a tax bill not 25 but 94 times what it was 35 years ago. Almost 22 million of the 30 million American homes, three-fourths of the factories, our cities, our commercial establishments and hundreds of thousands of our farms are today served by and to a large extent dependent upon this electrical servant.

The politician forever talks of God's free gift to the people but does not mention those who, together with their pioneer predecessors, over the past fifty years, by assuming great risks and by courageous enduring of losses and by overcoming skepticism and doubt, through the exercise of their own enterprise, initiative, and resourcefulness have bridged that enormous gap be-

* Abstract of E.E.I. convention paper.

tween the crude dynamos of the early eighties and the enormous generators of today.

Transmission no natural resource

Let us recall just one or two of the major improvements which had to be made before this new form of energy could be made available where it was needed: First, there was the development by successive stages in the decade from 1890 to 1900 of the possibility of long-distance transmission of electrical energy. Prior to that demonstration, there had grown up a considerable number of small and isolated power plants, many of them municipally-owned, many othsrs badly financed, and all furnishing what would be today an impossibly poor and unsatisfactory service. And who has been responsible for the continued progress of long-distance transmission in which all the public has so bountifully shared? This transmission did not just happen. It was not a natural resource except as the ingenuity and resourcefulness and determination of man are natural resources. No, it was the result of the struggle and the sacrifice and the courage of these private citizens—members of our industry—men who did not stop to consider whether they were liberals or conservatives, who did not ask for government subsidies nor special privileges, whose accomplishments for the benefit of their fellow-man must be attributed to the American system of private enterprise, with its freedom and its atmosphere of encouragement to achievement by the self-reliant individual.

We often hear the advocate of political management argue that no industry which is so important to public welfare and upon which so many people are dependent should be under the management of private citizens. It does not seem to occur to those who use that argument that if the industry is thus important, and we agree that it is, it is important because private management has made it so. It did not just grow up like Topsy; it did not just happen; it was, let us never forget, made important by those private citizens who today, we are told, cannot be trusted with its management.

Neither is our liberalism and progressive record confined to the more physical development and expansion of electric service. The true type of American public ownership—the participation by millions of customers in financing from their savings the extension of this service—affords another example of an improvement in method which is both progressive and typically American. Is that investment not another eloquent testimonial of confidence in the electrical industry as it exists today in America?

Again, we can point with pride to the public character not only of our service but of the information concerning our operations. If any industry in all the world does business in a glass house, it is this one with which we are connected. Not only our rates and charges, our receipts and expenditures, but all our investments, costs, salaries, wages, donations, contributions, losses and gains are spread upon the public records. Our customers have available to them as much information as do the owners of the properties, the stockholders. If there is any information concerning the details of the conduct of our business which the public does not have at its command, its omission can be charged only to the fact that no one has yet thought of it. What a misnomer it is to call our business "private." All business activities of these miscalled "private" public utilities are in fact much more fully disclosed to the public than are those of many of the governmentally-owned and operated units. Particularly is that true of the accounting as to costs and charges.

Hold Faith in Liberality of Industry

I AM not advocating a public relations program based on boasting as to how good we are. I agree with those who favor letting our actions speak louder than our words. But at the same time let us not be so apologetic as to give a false appearance of shame in the face of attack. Let us be respectful of authority, but not so abjectly respectful that we fail to exercise our rights as citizens to insist that authority shall not be abused. Let us be neither so modest nor so timid that we fail to assert a proper pride in our work. True liberalism seeks to advance new ideas, new processes and new methods through encouragement by reward and proper recognition of the merit of all who can contribute to progress. True liberalism holds that the laborer is worthy of his hire and that the use of the powers of government to destroy individual leadership is a crime against society. As trustees of a great liberal industry we dare not lose faith in that industry nor fail in our obligation to fight for the preservation of those conditions which have made possible its leadership.

R. M. Gates, Combustion Engineering Corporation; Edward T. Gushee, Detroit Edison; C. W. Appleton, General Electric, and Schuyler Casey, M. H. Treadwell Company

Safety Programs Pay Lasting Dividends

Inculcated as a Reflex Habit, Accident Prevention Also Embraces Health Examinations, Company Credit Union and Follow-Through Care of Accident Cripples

By W. E. MITCHELL*
Vice-President and General Manager Georgia Power Company

HAS it ever been your job to work for several hours futilely trying to resuscitate a fine young lineman and then, knowing in your heart it was an unnecessary accident, have to go and break the news to a poor, frightened, crushed young woman, whose only means of support was that man? Unfortunately, that has been my painful duty a number of times. If nothing else had done so, this would have made me a firm believer in safe practices.

Unfortunately, very few people acquire the safety habit in childhood. A great many grow up with the contrary habit of carelessness, thoughtlessness, indifference to the safety of others. That is why safety programs are needed. With such people the program arouses their interest in safety, starts them to thinking about its importance, causes them to become aware of their own bad habit of carelessness, provides constant reminders to keep the brain working along the proper lines, offers recognition and rewards for good practices and punishment for bad practices, impresses the idea deeper and deeper into the man's mind until it becomes a part of him, and, finally, it has become a habit.

Before our safety program was launched, the men had a right to believe that the company didn't care whether they got hurt or not. They probably never thought it out consciously, but the company's attitude influenced and affected their attitude. Slackness and carelessness were widespread, simply because safety and carefulness were not being promoted, and an enormous number of accidents occurred.

The foreman is the key man in any safety program, but he'll never truly enter into it, nor sell his men on it unless the superintendents, local, district and division managers and main office supervisory staff, clear up to the general manager and president, are also thoroughly sold on the worthwhileness of it. Therefore, a sane safety program must be organized from the top down.

An impartial, thorough investigating committee can usually find the true cause of every serious accident. The important thing is to prevent a recurrence by a thorough explanation and discussion of the accident with all other crews liable to be caught in similar circumstances. Firm, prompt penalties for carelessness or infraction of safety rules are applied. In our business the foreman's first duty is the safety of his men, and it is our endeavor to never let him forget it.

Examinations and credit union

We think annual medical examinations for all over 40 are properly a part of our safety program and have paid big dividends.

A lineman about to be garnisheed is not in the frame of mind to be a safe workman, particularly when he remembers that it is a rule of the company that he'll be discharged if garnisheed. What does he do? Why, he goes to the loan shark and then he is in for real trouble. Finally, he gets in so deep he has to come to the company, but usually he is ashamed or afraid to tell the whole amount of his debts. In 1930 this situation had become so bad that the company had made advances of $26,000 to employees, not for company purposes, but to aid the employees. Today the amount of these advances is $2,500. How was this done? By sponsoring eight employees' credit unions organized under federal charters. Did that save the company any money? Yes, and it made better employees. You say, "Yes, but a far call to safety." No, just a part of the safe and sane program.

In the days to come we are facing more unrest among the laboring class than ever before. Labor will make new and often unreasonable demands. How better can they be met than by the development of mutual trust and confidence through safety meetings?

More and more important to the success of any enterprise will be the loyal, efficient service of its employees. A careful selection of the employee, his careful training, an adequate safety and health program, and a decent regard for the rights and needs of the employees are most important factors in building the ideal employee group. No industry has a more intelligent, more loyal, higher type group of employees than the public utilities of this country. The safety program has been tried and has paid big dividends.

* Abstract of E.E.I. convention paper.

Interconnection Needed to Close Certain Gaps

Superpower Gone Forever — Bulk Transmission Goes Lesser Distances — Mutual Reserves, Mutual Help, Mutual Economies, Mutual Trust Are Still the Attributes of Judicious Interconnection

By PHILIP SPORN *
Vice-President and Chief Engineer American Gas & Electric Company, New York

THE era of superpower seems definitely to have disappeared some seven or eight years ago, and none of us regret its passing. Of all the ideas and terms loosely used, superpower was undoubtedly the prize winner in the field. It had the distinction of being the subject of more conversation and less understanding than almost any other utility idea. Nor had it much more economic validity. But the disappearance of discussion and the present lack of interest in the subject of interconnection are less understandable. For interconnection is a horse of another color and it cannot be overlooked. To forget it may prove dangerous.

There are a great many apparently good reasons for the present indifference to the interconnection idea. For one thing, many lines were built in the expansion period of the middle 1920's and a large proportion of them were high-tension lines. With the building of these lines many of the systems settled down to a quiescent state, confident in the belief that they had developed a fully interconnected system. But one interconnection does not necessarily make an interconnected system, nor do two, nor any specific number. Again, there are many cases today where interconnections might be made, but no interconnections are even being considered, because people now are increasing capacity by putting in "topping" units. "Topping" or "superposition" is the style. This, too, is unfortunate, because aside from the fact that fad or style has no business in the development of facilities of the utility systems, the overstressing of the cost of generation always carries with it the danger that sight will be lost of the

fact that cost of generation is a very poor criterion, and very definitely a dangerous one, if used as the sole criterion, of the cost of electric service.

Interconnection undeservedly in eclipse

There are cases today where no interconnections exist because, an economic study of the particular interconnection having been made once and found unjustifiable, the interconnection idea has been dropped and not revived or restudied regardless of the changed circumstances that might today give a totally different answer. There are other cases where interconnection is not being considered because the managers of the properties are confirmed believers in the economic soundness of local generation and in the absolute unreliability of any and every kind of transmission line, no matter how short or how well designed and operated. In these cases consideration has not been given to the fact that there is an economic limit to the breakdown of the size of the generation unit and that in taking flight from the old herd idea of excessively large scale centralized generation and long-distance transmission, so popular some ten years ago, neither relief nor safety is to be found in the once maverick notion, now rapidly becoming a new herd principle, of great multiplicity of power generation units. Besides, they have forgotten that the technology of transmission has been definitely advancing.

This group has received a great deal of support and confirmation of its views from the policies of the Public Works Administration during the last five years. This agency, too, has followed a consistent policy of supporting local generation no matter how well supplied an area might be with interconnected system facilities. But I take it that most of us here are at least unanimous in this belief, namely, that over a long period of time it will not be possible to give better or cheaper electric service by developing less efficient plants and systems, and that, of course, is what generation localized in small enough units means every time. Finally, since the 1920 decade, when interconnection was on every tongue, so to speak, there has been enacted the Public Utility Act of 1935. The natural tendency of that act is to retard the integration and interconnection of utility systems. However, there are quite probably some cases where interconnections might be made with advantage

* Abstract of E.E.I. convention paper.

even under the unfavorable atmosphere created by that act.

Utilities of the country, operating under private management and acting voluntarily, have succeeded admirably in the task of interconnecting and co-ordinating their systems. But, in order to keep the record straight, it must be admitted that there are some gaps, perhaps not too many gaps considering the difficulties involved, but too many if any of these gaps are being left open when the proper time for closing them has arrived.

The proper time to be able to do almost anything in the way of expansion of physical facilities on an electric system is no different than in any other kind of a business, and that is in the period when the business or load is growing. The electric utilities of the country are going through such an expansion period at the present time. The present time may, therefore, be the time for closing some of the gaps in the interconnection picture. It behooves us, therefore, to re-examine this business of interconnection and find out what is behind it, what is its basic philosophy, what are the benefits that can accrue to a system and to the public which it serves, what are the difficulties in the way of putting it into effect, and what can or should further be done about it.

What interconnection is

Basically, interconnection of utility systems involves the idea of so operating the component parts of a system or a group of separate systems that under all conditions generation and transmission are accomplished in the most efficient manner. This means that the power supply will be handled not only with no substantial sacrifice of reliability of supply, but with actual enhancement of that reliability under normal conditions, and with very positive assurance of service under conditions of unforeseen emergencies that cannot be provided for economically, if at all, in any other manner except by making available sources of supply from points remote from the immediate area subject to the emergency or contingency condition.

The philosophy behind interconnection then postulates the idea of mutual help and of mutual support in times of need, without stint, up to the limit where the helper himself is jeopardized. This is very important, because now and then one comes across systems where all the instrumentalities for interconnection are available, yet no true interconnection exists. The reason is that those responsible for the planning and operation of the system in such cases have not really been converted to the idea of interconnection. They merely play with the idea. They are inwardly afraid that if they operate interconnected they will subject themselves to, and will have to share, other people's troubles. Yet, the philosophy of operating truly interconnected, as I have pointed out, is sound, provided you grant that the technique of operating interconnected can be so developed as to reduce the self-jeopardy of the aiding part of the system, or of the aiding system, to a negligible amount. It can definitely be stated that the technique of operating successfully on an interconnected basis has been developed and is being more closely perfected every day.

In the light of this definition, it is apparent that many cases of so-called interconnection are not interconnections in the true sense of the term, because the amount of help that they make possible and the resources that they make available for mustering in cases of emergencies are definitely circumscribed and limited.

What can be accomplished by interconnection

The theoretical benefits of operating interconnected presumably are too well known to warrant any detailed discussion. Basically they include the possibility of centralizing generation at economical locations and in economically sized plants and units; the cutting down of operating reserve; the taking advantage of diversity; the staggering of construction of capacity between parts of a system or between different systems; the more efficient utilization of existing generating facilities, and, most important of all, the supplying of help in case of an emergency.

Return must be adequate

Many savings that we have made on old interconnections or on newly worked out interconnections are developments that were not exactly simple, but yet, once they were worked out, they made possible improvements in grade and cost of service that could not have been made in any other manner.

No utility company has a right to proceed with a facility unless the prospective return is adequate. It cannot, and has no right to, indulge in any grandiose schemes of interconnection because they fit so well into a preconceived paper picture of how a group of systems ought to be co-ordinated. Nevertheless, it must be recognized that too narrow a view will frequently not show all the return that is in sight. There frequently are cases where the immediate direct return does not compare in value or significance with the system benefits obtainable during extraordinary emergencies.

In each of three recent great flood emergencies interconnection came

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BUT even if the working out of the interconnecting problem involves difficulties, it still is imperative that we pay more attention to it than we have in the last six or seven years. It is imperative because we must not forget that the principle of interconnection offers these possibilities in a utility system:

Better service, lower cost service, better protected service, and more solidly protected capital investment. Above all, and under all conditions, the satisfaction and the peace of mind that come from a definite knowledge that the utmost that can be done by a progressive art and by the intelligent application of capital has been done to assure a proper discharge of the responsibility assumed in undertaking to render utility service. It is true that a great many difficulties are involved in carrying this out, but, still, it must be admitted that the end sought is worth the effort needed to master all the difficulties. For I take it that nothing less than the complete result enumerated above can or will satisfy a conscientious and progressive management. And conscientious and progressive management has been behind the phenomenal development of the unparalleled electric supply system we have in the United States today and is the only real assurance of the continuance of its further development.

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through with flying colors and saved the service. It did that because the interconnections were not half-hearted and because the systems had been operated for years with that end in view. Perhaps the monetary value of being able to do this is a little harder to estimate. But, can anybody overestimate the value of the gain in good will, of the gain in confidence—even in affection — of a community, that comes from sustaining it in a period of emergency like a flood?

In all of this it ought to be pointed out that no long distance transmission of power is involved. Those who have closely studied the problem of transmission and thoroughly understand the economics of power supply know that there is no sound economics in long-distance transmission of power.

On the American Gas & Electric Company system, for example, the actual mean weighted distance of transmission under normal conditions in the nine states over which the system extends is less than sixty miles.

The economies pointed out above were accomplished, therefore, without doing violence to that fundamental of relatively short transmission distance. Further, these examples definitely bring out the very important principle of sound system planning which interconnection and operating interconnected makes possible, namely, that after having provided against almost every conceivable emergency that can occur in the business and in the great responsibility of operating a utility system, it is highly desirable and, in many cases, almost necessary, to provide against contingencies wholly inconceivable and unpredictable, and that in general can economically be provided only by interconnection.

Course of action proposed

Granting that the ideas developed above are substantially sound and have real merit, what is there to be done?

Interconnection — interconnection under proper conditions—is more than merely a problem in the purchasing of a block of energy. It is more than a few mere kilowatts and kilowatt-hours.

On an affirmative basis this can be said: Whenever any system finds itself up against a planning problem, that is, a problem involving the planning of additional capacity either in the form of additional transmission facilities or in the form of additional generating facilities, or confronted with the problem of firming or improving the service to any particular district or area, or whenever it is confronted with the problem of transferring or transmitting power from a point on the system where there is a superfluity of power facilities to a point where there is a deficiency, it is highly desirable that all its neighbors be consulted. These neighbors may all be in a very limited region or they may extend over the entire state. Sometimes they may even extend across state boundaries, but a good criterion to follow is this: Taking a reasonable forward view of likely development, what would be the soundest thing to do from a standpoint of providing adequate service and proper facilities at lowest cost if all the properties involved were under a single management or ownership? If the answer to this should be the desirability of interconnecting portions of systems that are not interconnected, or of building generating capacity in one portion as against another portion previously contemplated, then those are the things that should be done and agreements consummated to properly and equitably share the burdens and benefits of such interconnections or of any other facilities. Further, if such an investigation should disclose no immediate likelihood of justification of joining of facilities, it ought to be remembered that as system loads grow the conditions underlying the economics and the benefits or values of pooling of facilities are likely to change.

It becomes necessary, therefore, to re-explore these situations again and again as frequently as changing conditions of sufficient consequence occur, and when the conditions finally warrant an interconnection then it should be made. Thus will the gaps in the picture of interconnection—interconnection which goes back to almost the beginning of the utility industry—be closed. With the closing of these gaps there will be brought to full development the task of constructing a co-ordinated system of power supply begun by private management more than fifty years ago. This work has already resulted in the existence of an electric power system in the United States which stands out above the systems of the rest of the world in country-wide availability, quality and cost of service.

Election of Officers

A NOTE of encouragement to the gathered utility leaders to expand facilities and services as a means to greater progress was sounded by Charles W. Kellogg, chairman of Engineers Public Service Corporation, as he was unanimously re-elected president of the Institute. He saw a brighter outlook for the industry with a better public understanding of utility operations and a higher rate of industrial activity.

W. E. Mitchell, Georgia Power, was elected a vice-president. Other officers re-elected included Paul M. Downing, Pacific Gas & Electric; A. H. Kehoe, Consolidated Edison of New York, and J. E. Davidson, Nebraska Power, vice-presidents; F. H. Nickerson, Consolidated Edison of New York, treasurer; Bernard F. Weadock, vice-president and managing director; H. S. Bennion, assistant managing director, and Mae B. Woods, secretary.

Trustees elected for the term expiring 1940 included Floyd L. Carlisle, Consolidated Edison of New York; William Chamberlain, United Light & Power; Harvey C. Couch, Arkansas Power & Light; Louis H. Egan, United Electric Light & Power; Philip G. Gossler, Columbia Gas & Electric; Oscar H. Fogg, Consolidated Edison of New York; W. H. Taylor, Philadelphia Electric; George N. Tidd, American Gas & Electric, and John E. Zimmermann, United Gas Improvement.

Educate the Public on Better Light

Doctor Urges the Dissemination of the Virtues of Adequate Light for Seeing and Promises Co-operation

By Dr. MORRIS FISHBEIN*
Editor Journal American Medical Association, Chicago

THERE are many millions who abuse the good eyes with which they began life by failing to provide those eyes with satisfactory working conditions. Without adequate care, the eye may serve the individual with partial service throughout his life or it may give up working completely long before the time when it should.

The United States Public Health Service investigated the amount of illumination and the ocular efficiency of an employee in the sorting of mail in the Chicago Post Office. This, of course, is close work, carried out under circumstances of rapidity, and because of the fact that it involves the rapid handling of a considerable number of units of standard size, the work permitted adequate measurement. It was found that a definite relationship existed between changes in illumination and the amount of first-class mail that could be sorted by the mail clerks in the routine course of such work. When the illumination was moved up from 3 ft.-candles to 11 ft.-candles the amount of work increased 8 per cent. At the same time there was a lessening of errors.

Good light, print and health

Three factors of the utmost importance in preserving good vision in school children are good light, good print and good health. Any school ought to be able to provide good light and good print, and it is up to the parents to see to it that everything possible is done to preserve the health of the school child. The proper amount of light on each child's desk is that obtained from a 60-watt frosted bulb placed from 16 to 20 inches away from the printed page. Since each child cannot have a light of this type on its desk, correspondingly more light is required when the source of the light is still farther from the page as the school ceiling fixture.

A recent investigation showed that the eye of a person 63 years of age can be made to have at 60 ft.-candles an ability to see that is possessed by eyes of the younger people at 5 ft.-candles. Eyes of people 63 years of age can see at 27 ft.-candles what the eyes of younger people see at 2.5 ft.-candles. Moreover, the investigation showed that a far-sighted individual 70 years of age can see as well with 100 ft.-candles as young eyes could see with 1 ft.-candle. Thus old people are going to be able to see more and to work longer if they are provided with the necessary intensity of illumination required by the eyes of the aged.

The eyes of the aged need more light because the pupil is smaller, the power of the eye to develop images is less, the materials through which the light passes to the retina are diminished in their transparency and all of the tissues in the eye involved in adjusting itself to light and images of various sizes and intensities are likewise decreased. In giving comfort to the older people in the family who derive most of their pleasure in life from reading, the provision of adequate illumination means at least 100 ft.-candles for most purposes.

There is already available a vast amount of established knowledge regarding eyesight and the effects of illumination on vision. Much of this information may be translated from this point to a consideration of the relationship of vision to output in industry, in sports and in the home. Long ago the spectacle industry saw the advantage of establishing suitable organizations to aid in the sale of eyeglasses and we see them represented in such associations as the Eyesight Conservation Council.

Educational program planned

The American Medical Association attempts to improve the hygiene of the eye through its Bureau of Health and Public Instruction. There is also the National Association for the Prevention of Blindness. None of these organizations has, however, concerned itself particularly with the question of the relationship of adequate illumination to adequate vision. For this reason the effective Better Light-Better Sight program of the electric and cooperating industry is the more commendable.

It is necessary to extend this information not only in Hygeia, but also to the many millions of persons who might be reached by suitable publicity in newspapers, in other magazines, and over the radio. Coincidentally with these efforts, there is the possibility of reaching additional millions by suitable employment of modern advertising methods, involving not only the radio, the newspapers and the magazines, but also billboards, direct by mail circularization, education in the schools, and all of the other methods that have come to be recognized as valuable.

* Abstract of E.E.I. convention paper.

Selling Will Win the Public

Public Relations Seen as Selling Job Resting on Shoulders of Every Employee — Problem Is Internal, to Be Approached Through Education

By J. F. PORTER, Jr.*
Vice-President in Charge of Sales
Kansas City Power & Light Company, Kansas City, Mo.

IN MOST businesses public relations as a problem can be somewhat minimized. People can simply ignore other companies if they feel somewhat at outs with them. But since it is usually impossible for one of our customers to give part or all of his business to another utility, he feels that he is forced to buy from us whether or not he approves of our company or its policies. If resentment once starts, from whatever cause, it can be disastrously reflected in many ways, and so the matter of public relations and public attitude is much more sensitive in our case than it is with other interests.

Now this would be nothing to worry about if all the executives in our companies were able to deal directly and personally with each and every customer, but this, of course, is impossible, and so the relations between ourselves and our customers—and the public in general—are frequently decided by the way the public has been treated by those in subordinate positions in our organizations. And that statement is meant to cover everybody from those immediately below executive rank to the lowest paid of our employees.

Now, the only way, it seems to me, that we can overcome our public relations difficulties and at the same time time win the public over to a realization that our policies are sound and just is to make every person in our organization realize that he has a selling job to do, and that the carrying out of his particular work must be along sales lines.

In approaching this question of public relations it is not a matter of looking for some mysterious method, some magic wand we can wave or some electric button we can push which will solve our problem. It is, rather, a matter of internal operation whereby all of us will obtain the sales viewpoint and constantly sell each other and every person we meet on the policies and ideals of our company. Millions of dollars could be spent in endeavoring to wave some type of magic wand to improve our public relations, and yet this money would be wasted if we, as employees, whether executives or meter readers or what-not, failed to handle customers and the public generally in a diplomatic and saleswise manner. And viewing this, first of all, as an internal problem, I believe that it must be approached by developing a realization that all of us are salesmen and that we must do a selling job with *every person we talk to.*

Selling is mostly diplomacy

Now, let's get clearly in our minds what I mean by a selling job. Certainly it would be foolish for us to try to give a sales talk on our company every time we talk to some individual. That is selling, of course, but I am looking at selling from the broader viewpoint of handling people diplomatically. For diplomacy is a real job of selling. The proper handling of complaints is a real job of selling. In fact, every time we make a customer feel that we understand his viewpoint and his thoughts, and show him that we can recognize his problem as being our problem too, and do our best to help solve that problem, we do a real job of selling.

I believe that we must so educate our people that they realize they are a part of the company, and likewise educate them—in schools if you will—whereby they understand the benefits of our policies, our operations. When every representative of a utility is salesminded, is able to talk as a salesman for us, our public relations are bound to improve. In fact, they will improve so rapidly that we will come to consider them a minor problem.

That is why I feel that the matter of public relations is mainly an internal problem, and that when you executives lay plans for improving your public relations, one of your first steps should be the making of salesmen out of each and every employee.

A corporation may spread itself over the whole world and may employ a hundred thousand men, but the average person will usually form his judgment of it through his talk with one individual. If this person is rude or inefficient, it will take a lot of kindness and efficiency to overcome the bad impression. Every member of the organization who in any way comes in contact with the public is a salesman, and the impression he makes is an advertisement, good or bad.

Public relationship is merely the result of the impression our customers get of us. Therefore, gentlemen, I believe you will agree with me that it is advisable that we first educate ourselves so that we can create the proper type of impression.

* Abstract of E.E.I. convention paper.

The Status of Rural Electrification

National Rural Electrification Policy for the Utilities Advised — Would Define Relations With Other Utilities and Co-operatives and Customers —Load Building Seen as Educational Job Directed at the Farmer

By D. E. KARN *
Consumers Power Company, Jackson, Mich.

THE job the utilities have executed so far has been a big job, but as big as it has been, the job ahead is much bigger and the problem becomes more difficult as lines extend further into the more thinly settled rural areas where non-farm rural customers decrease to the point that extensions actually become farm lines instead of rural lines.

The present seems to offer an excellent opportunity to capitalize on past experiences in presenting a united front by establishing, as nearly as possible, a national rural electrification policy for the electric operating companies.

Some problems of importance

Some of the problems of importance to the utilities that should be included in such a policy are:

1. The question of the rights of existing utilities to extend their service into territory not now served.
2. The question of wholesale rates to electric cooperative associations.
3. A study of the policies of operating companies as to their program for the occupancy of unserved territory.
4. The attitude of utilities toward rural electrification.
5. The purchasing power of farmers and agricultural trends that influence purchasing power.
6. Standardization in cost and design of rural lines.
7. Building load on rural lines.
8. Dissemination of information in the quickest time and in the most practical manner.

Building load on rural lines. I rather hesitate to broach this problem in the limited available time, because in the last analysis, this is the answer that all utilities have been seeking since the first rural line was built, and while the answer may be somewhat closer today than it was a few years ago, it is still beyond tangible grasp. However, it is one phase of the program that is flexible enough to be readily merged into a national policy. In fact, the merging has rather generally taken place and may be enumerated as:

First—That the job of building load on rural lines is not primarily a merchandising job of operating companies; rather, it is a job of education, the education of rural customers, especially farmers, to the many advantages and uses of service on the farm and the education of hardware and implement dealers and other merchandising agencies, together with manufacturers, as to the sincerity of the utility in its co-operative efforts and to the existing and potential local market for electrically operated equipment.

Second—Rural merchandising by operating companies should supplement the educational program and be largely confined to a rural sales force and to domestic equipment and appliances.

Farm selling specialized

It has been learned that urban salesmen without a farm background have difficulty in selling rural customers, especially farmers. It has further been learned that the merchandising of farm equipment other than domestic doesn't correlate with the general merchandising program of electric companies and that the companies merchandising farm equipment have difficulty in interesting local merchants to carry stock and push sales.

Third—To assist in both the educational and co-operative dealer programs, the rural sales sub-committee of the sales committee of the Institute could enlarge its present program. It has been suggested that the committee set up local rural sales bureaus somewhat along the lines of the local refrigeration bureaus and local kitchen modernization bureaus. It seems reasonable to assume that bureaus of this nature would be given financial support by farm equipment manufacturers and that they would develop into an enterprise that is similar in nature to the Water Systems Council, which has established a very commendable record.

*Abstract of E.E.I. convention paper.

O. A. Jennings, Oklahoma Gas & Electric; W. H. Hodge and H. W. Eales, Public Utility Engineering & Service

James W. Irwin, George E. Durban and H. J. Walker of Frigidaire Corporation

M. O. Troy, E. H. Ginn and R. B. Beale, all of the General Electric Company

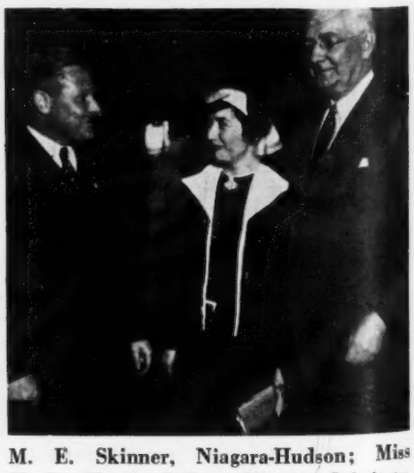
H. H. Bosworth, manager Central Station Division, Nela Park, Cleveland, and F. B. Culley, vice-president Southern Indiana Gas & Electric Corporation

Major H. S. Bennion, Edison Electric Institute, and George E. Whitwell, Philadelphia Electric Company

H. V. Erben, General Electric; R. E. Fisher, Pacific Gas & Electric, and C. E. Greenwood, Edison Electric Institute

H. W. Young, Delta-Star, and H. P. Sparkes, Westinghouse

H. R. Woodrow, James S. Fairman and John C. Parker, all of Consolidated Edison Company of New York



M. E. Skinner, Niagara-Hudson; Miss M. B. Woods, Edison Electric Inistitute, and W. K. Vanderpoel, Okonite

Women's Part in Increasing Usage

Home Service Organization Combines Selling, Servicing, Customer Relations on Paying Basis

By MISS NANCY FINCH*
Director of Home Service, Utah Power & Light Company, Salt Lake City

SINCE 1930 the residential field has increased tremendously in importance to us as a load-building possibility and we have developed our organization to cover this field, because the income from it is more stable than that from industry and commerce.

This has meant that selling to women in homes has increased in importance. Now the greater part of our selling and our advertising by newspaper and radio is being directed to the woman in terms which she will understand, and the term which she understands best is "use."

How have these things influenced our organization and the development of our home service department? It has changed our interests largely from the big user to the small home user; from selling to men in offices and factories to women in homes. It has changed the training of our salesmen from parts, machinery and just equipment to the use of the equipment in meeting problems of the home. Men still remain too technical in their selling, for they love to talk facts, construction, material and such things, for which the average woman has no interest. Women are interested only in what equipment will do for them in their *own* homes.

It has given our home service women a tremendous opportunity to fill a place of importance in the sales organization. Previous to 1934 the few home economists (eight of them) were not much more than teachers and glorified trouble shooters. They followed the sale of ranges with instruction as to operation, and, because it was costly, never did cover what rural territory and extensions there were to any great extent.

Beginning with 1934 and the Better Light-Better Sight campaign (the first

one) the educational work of the department increased, but with women hired to work only as lighting advisers. They sold only as they were part of the general all-employee campaign for selling floor and study table lamps. At that time all of the home economists were given the training in lighting, but only three of them made much of an effort to take it into homes. They felt it no part of their work. The special lighting advisers worked only in our two largest towns of Salt Lake and Ogden.

As a department we were organized in May, 1935. In August of that year we increased the group to 48 women, with the home economist in each division as supervisor of the women there both in lighting and home service, and with a supervisor for the entire organization in the general office. We were still mostly lighting advisers, but were more definitely on an earning basis and trying to find a measurement for the work done. In January of 1936 we began training to make all of our women complete advisers, and we have operated that way ever since.

Our advisers are saleswomen, because we have found that the time to sell equipment to a woman is when we have sold her the idea, the advantages and the use. The housewife may not want to wait days or weeks for the equipment once she has made up her mind to have it. This will work only for small fixtures and lighting fixtures. Such things as lamps she will deliver herself within a day or two. Washing machines, ironers, sewing machines she will sell through a dealer organization who will handle the delivery.

We sell because we have become convinced that it is the adviser who can sell appliances who can also do the best job of selling use and service, not to mention making her customer more satisfied, and doing a better job of developing a friend for her company. Personally, I am convinced that we cannot really sell service and advantages without selling equipment to give them, and selling the merchandise is the surest means of measuring the effectiveness of the adviser's work.

It has increased the earnings of the department, since the major outlet for small appliances previously was through the sales floor; reduced our cost of supervision and mileage, and it gives us a better opportunity to do a complete and full year's program. It does have the disadvantage of costing more to train women, but we feel that that is less costly than duplicate trips, and our earnings would indicate that this is true, because the girl produces better once she is out in the field.

*Abstract of E.E.I. convention paper.

Opportunities and Problems of Air Conditioning

Promotion and Engineering Assistance Rendered by Company — Problems to Be Solved by Manufacturers and Utilities

By EARL W. GRAY*
Commercial Department, Oklahoma Gas & Electric Company, Oklahoma City

EVERY new business brings with it opportunities for those who will accept them. Air conditioning brought to the electric utilities an opportunity to build their load beyond anything dreamed of and, what is equally important, gave them an opportunity to assist their customers in profiting from this development. The service of the utility includes more than the sale of kilowatt-hours. It is not complete until it carries through and sees that the energy purchased earns a return for the customer.

In the beginning we had difficulty because there were no experienced firms to sell the equipment. When we asked for bids on equipment for the first air-conditioning installation in our own building it was forcibly demonstrated to us that many of those selling equipment were somewhat at sea. It was evident from this experience that we would have to take the lead in both promotion and engineering, by acting as consultants for our customers and dealers. We won in our mechanical and structural design engineering department handle the detail engineering and writing of specifications for those jobs that the commercial department considered worthy of such service. This plan has been followed through and has given excellent results. The revival of business has made it necessary to increase the personnel of the engineering department, and new men have been chosen with close attention to previous training and experience that fitted them for air-conditioning work. Under this arrangement, with the fluctuation of the air-conditioning season, as many men as are needed are available for assignment to air conditioning engineering, and only the actual time used is

charged against this promotion. The rest of the time these men are busy on the general run of work handled by the department.

The division commercial manager develops his prospect and gives him an approximation of the capacity required, installation cost and operating cost. If the customer requests specifications, a survey is made and specifications are furnished which give the capacities necessary, a general description of the equipment and a suggested method of installation.

Specification written for small customer

In the preparation of specifications, standards are used which are a compilation of the best data available from the various manufacturers, the A.S.H. & V.E. and our own experience. The specifications are written so the equipment of any reputable manufacturer may be used. A check is made by the distribution engineering department to determine the service facilities available at the given location, and this, together with a determination of the rate application, enables us to designate in the specifications whether single- or three-phase motors shall be used, permissible starting currents and the metering arrangement.

We are in no sense in competition with consulting engineers. In fact, on many jobs we recommend that an engineer be retained. This phase of our work is limited to the smaller jobs, where the customer will not retain an engineer, but is reluctant to purchase of equipment about which he knows nothing and is done only on the direct request of the customer.

The utilities are not the only ones which have had problems. The manufacturers have had their share, and one of the most trying has been the difficulty of finding satisfactory outlets. The utilities should continue to assist the manufacturers in securing good representation, as our promotional efforts will get results only according to the activity of the sales organizations.

Air conditioning has been accepted most rapidly by our restaurants and retail stores. It quickly shows a profit, and after one season's operation the owner says he would not do business without it. In the larger centers competition between merchants is now selling air conditioning. This is shown in Oklahoma City, where in three blocks on Main Street twenty-nine stores now have air conditioning, and several others have delayed only because of lease difficulties. Office buildings and other installations come on more

*Abstract of E.E.I. convention paper.

slowly because of the larger investments necessary.

Of course we all want to see the prices reduced so our market will be increased. We are the ones who can bring about a reduction. No rapid decrease can be expected in commercial air-conditioning costs because of the large percentage of the total, made up of local items of labor and material. The room cooler price, however, is largely equipment cost. If the utilities will get behind room coolers as they did with electric refrigeration quantity production will reduce prices.

Room cooler can be sold in volume

Room cooler installations present problems that must be given attention. The tendency has been to sell them as socket appliances, but we know that motors of the size necessary in the larger models will not generally operate satisfactorily on 115 volts because few of our older buildings have circuits larger than No. 14 wire. Some dealers think that the utility is unusually severe in requiring that motors above $\frac{1}{2}$ hp. be operated at 230 volts. After a few experiences with motor trouble and after we have convinced them that we are furnishing full voltage at the entrance, they decide that there may be a reason for such a requirement. Unfortunately, some of the manufacturers are shipping out machines built only for 115 volts, with no provision for reconnection. The horsepower rating is not an index of the power input as we find room coolers with $\frac{3}{4}$-hp. motors having an input of 1,250 watts. Other air-cooled room coolers have a total input for compressor and fans as high as 1,500 watts.

Various problems have arisen, not only in promoting but also in serving the air-conditioning load. Rates, as for any load, must be competitive. Some companies have not found it necessary to promulgate special rates, but have waived the application of demand ratchet provisions to summer demands. Summer air conditioning for some applications has a low annual load factor, but the increasing acceptance of year-round conditioning brings an improvement.

Heavy air-conditioning load in congested areas served from an underground system requires a large investment in facilities to serve low load factor business. The utilities and the manufacturers must work together to improve the characteristics of this load. Further developments in the use of the reversed cycle of refrigeration for winter air conditioning and various types of storage systems offer much promise. There is now being installed on our system a combined direct expansion and storage system to handle a 130-ton load with a 75-hp.-compressor.

The leaders of the industry realize that there is still much to be learned about air conditioning and are conducting a tremendous amount of research as well as formulating standard codes for design and application.

Coffin Award Won by Consolidated Edison

Unsurpassed Quality of Service in Largest Metropolitan Area in the World Is Basis for Coveted Award

"For distinguished contribution to the development of electric light and power for the convenience of the public and the benefit of the industry"

is the legend on the Charles A. Coffin Medal awarded by the judges to the Consolidated Edison Company of New York, Inc. Presentation was made at the final session of the E.E.I. convention of 1937 by Gerard Swope, president of the General Electric Company, the medal being in commemoration of one of his predecessors. Vice-President John C. Parker accepted the award on behalf of Consolidated Edison. Judges were Charles W. Kellogg, president of E.E.I.; Dr. Karl T. Compton, president of M.I.T., and Louis H. Egan, president of the Union Electric Light & Power Company of St. Louis.

From the Citation

"The winning company, together with its subsidiaries, supplies service to the greatest metropolitan area in the world. The habits of the people and the very size and structure of the city itself have been shaped and built upon electric service, creating the most exacting demands upon the company that furnishes that service. In this difficult situation the winning company has supplied electric service of as high quality as is to be found anywhere in the world."

Major Accomplishments Cited

Unification and simplification of corporate structure
(Eleven mergers ended in only five company units)

Sales promotional activities — Simplification and reductions in rates
($8,376,600 saving to customers in one year's reductions)

Steady improvement of physical properties
Successful large-scale refunding operation
(Annual interest charges reduced $5,000,000 in 1936 refunding of $210,000,000)

Public relations advances
(Neighborhood branch office system affords advantages of small community contact)

Engineers Promote Social Progress

Industrial Research and Evolution Steadily Extract More Benefit Out of Material Resources and Technical Talent

By R. C. MUIR*
Vice-President in Charge of Engineering, General Electric Company

SHOULD a time arrive when the individual cannot obtain more for his day's work, economic progress c ases, so that the job of the engineer is never finished; it is a continuing thing. Putting it another way, industry's mission is to provide more goods for more people at lower prices.

In the year 1920 twenty-seven billion kilowatt-hours were produced with forty-one million tons of coal, while in 1934 fifty-seven billion kilowatt-hours were produced and the coal consumption was just the same, forty-one million tons, so that through engineering we have been able to give the public more than twice the electric power without increasing the fuel consumption, a notable achievement in the conservation of fuel resources. Coincident with this improvement in efficiency, the reliability has increased, so that the capacity factor has increased and the power generated per dollar of plant investment has materially increased.

Materials for high temperature

Ability to utilize high-temperature steam—that is, 850 to 925 deg. F.—is permitting an increase in the use of high-pressure steam without resuperheating, with its attendant complication, and gives a low-cost, simple and highly efficient installation. This has been dependent upon the development of alloy steels of high strength at high temperatures which permit a stress at high temperatures of from three to four times what would have been permissible with the older materials.

One of the most outstanding ways in which the electrical industry has been "getting more for less" is in the superposition of high-pressure, back-pressure turbines on top of existing steam plants. Actually, the increased efficiency of the new boilers required by the superposition so reduces the fuel consumption chargeable to the old station as to make the 40 to 90 per cent additional capacity obtainable at only a slight increase in fuel consumption. That the industry is fully alive to this is attested by the fact that about one-third of the kilowatts in turbines which have been ordered by public utilities during the past two years are of this type.

Superposition saves fuel

What it has done, for instance, to the building costs chargeable to each unit of power produced you can imagine when you realize that an old building was utilized at nine times the capacity for which it had been originally designed.

In the past eight years seventeen hydrogen-cooled machines having a combined capacity of nearly 500,000 kva. have been placed in service. The gain in efficiency ranges from 1 per cent at full load to nearly 4 per cent at one-fourth load. Hydrogen-cooled turbine generators with a combined output upward of 1,000,000 kw. are now under construction.

Marked and continuing improvement of transformer efficiency has played an important part in reducing the distribution losses. Since 1920 the losses of distribution transformers have been reduced an average of 20 per cent, and the average full load losses of power transformers have been reduced 45 per cent.

With rapid advance in the design of network transformers the efficiency has been increased from 98.5 to 98.7 per cent.

There are now in service approximately 900 miles of oil-filled cable and there has not been a single electrical failure in this country.

Similar progress has been made in the design of oil circuit breakers. Probably the most striking of these developments is the 287,000-volt impulse type high-voltage oil circuit breaker. As compared to the conventional type breaker the interrupting time of this breaker has been reduced from eight cycles to three, the weight from 294,000 lb. to 113,000 lb. and the oil from 23,700 gal. to 2,300 gal.

Similar advances have been made in low-voltage, low-interrupting capacity breakers, so that to-day a 50,000-kva., 15,000-volt oil circuit breaker weighs less than one-half and has less than one-half the oil content of the breaker available a few years ago.

Household devices more economical

More than 880,000,000 incandescent lamps were manufactured last year and for each kw.-hr. used the user received one-third more light than he did in 1920 and each lamp cost him two-thirds less than the price he paid in 1920.

There are in service to-day more than 7,500,000 household refrigerators. To-day three electric refrigerators operate with the same electric power consumption as one required in 1924, and the user may purchase a much superior unit for less than one-half the amount he paid in 1924.

* Abstract of E.E.I. convention paper.

F.T.C. Utility Investigation Was Futile and Fallacious

Wholly Erroneous Impression of Write-ups Given by Federal Trade Commission in Reporting After Spending Eight Years and $2,000,000

By DEAN JOHN T. MADDEN *
Professor of Accounting, New York University School of Commerce

THE investigation which the Federal Trade Commission made into the operations of certain gas and electric utilities pursuant to Senate Resolution 83 embraces more than eighty volumes of testimony, reports and exhibits. They constitute more than a five-foot shelf of books. The commission was engaged in this study for eight years; the cost of the investigation to the government amounted to more than two million dollars. The cost to the companies is estimated to have been as much more.

Two summary volumes, designated as 72-A and 73-A, are extremely important because in the first mentioned volume the commission has undertaken to express opinions and conclusions as well as to state facts.

Inadequate, incomplete, useless

The commission was required to report the growth of capital assets and capital liabilities, but it was limited to the books of account. This was an inadequate, incomplete and practically useless method of arriving at results because it would not answer any question upon the reasonableness of the rates charged to consumers or generally the question as to the adequacy of value supporting the securities which had been issued. The utilities had been accused of issuing "watered" stock just as the railroads were charged over a quarter of a century ago.

The Interstate Commerce Commission had been engaged for some years in making a "nut and bolt" valuation of the railroads and it was well known, even when the Senate authorized the utility investigation, that the final valuation of the railroad properties based on the 1914 price level would be in excess of their capitalization. The results of the valuation of the railroads after many years of work and the expenditure of millions of dollars completely refuted the charge of watered stock for that industry as a whole. There is no reason to suppose that a valuation of the utilities made in 1928 upon the same basis as that of the railroads would have produced any different results. This much, then, in explanation of the almost futile job which the Senate handed to the Federal Trade Commission.

Harm beyond measure

The summary table of write-ups and inflation published by the Federal Trade Commission in Report 72-A has already been reproduced in books and featured in articles. Its totals were referred to as evidence in the debate on the Public Utility Holding Company Bill in Congress. It will in all likelihood be used repeatedly in public discussion. The extent of the misunderstanding which it has created and will create is beyond measure.

The figure which the Federal Trade Commission should have set out to determine, as far as possible, was the amount that property devoted to public utility uses increased in ledger value over the ledger value of such property when first devoted to public use other than through the net addition of used and useful assets in the course of expansion and improvement. This possibly was the intent of Senate Resolution 83. After having determined to the best of its ability what this increase in the ledger value had been, the commission could have determined for Congress and the public:

1. How much of the increase represented write-up; that is, an actual upward revision of ledger values on a public utility's books.

2. How much of the increase was due to purchase and sale between interests so affiliated or so substantially unified in interest that the restraint and discipline of arm's-length bargaining were absent and the increase in the ledger values constituted write-ups "in effect."

3. How much arose out of the purchase and sale of public utility property among strangers in arm's-length transactions.

4. How much of the ledger value that once was actually "write-up" or "write-up in effect" had been eliminated by write-downs, write-offs or retirement.

* Abstract of E.E.I. convention paper.

By such an analytical approach the commission could have provided the basis for an accurate and honest appraisal of the social significance of the totals determined. But the commission did not adhere consistently to either idea. Possibly the examiners received insufficient instructions to guide them.

Write-up total meaningless

As it stands, the total of alleged write-up in the summary table of the Federal Trade Commission is meaningless and it should not be uncritically employed in the future by any legislator, scholar or author. It adds amounts arising from indefensible incidents, to amounts reflecting the results of ordinary well disciplined business conduct having no undesirable social or business consequences. On the other hand, the summary table fails to include all the increases in the ledger value of public utility assets, for the authors of Summary Report 72-A did not include all increases incident to purchase at arm's length.

Even though there was a transfer of assets from one affiliated enterprise to another, in the absence of arm's-length bargaining, at prices higher than the seller's ledger value, it does not follow that the transaction necessarily resulted in over-valuation. Such write-ups "in effect" as well as write-ups in fact are not evils merely because they fall into the category of write-ups from the accounting point of view. Moreover, the identification of an incident either as a write-up in fact or as write-up "in effect" constitutes no passing of judgment on the merits or justification of a transaction. Had the Federal Trade Commission investigation made an ascertainment of value (which they were not authorized to do) or even determined the most useful evidences of value, cost, cost of reproduction and depreciation, economic tests of the propriety of write-ups or write-ups "in effect" could have been applied. What I wish to point out is that there is no warrant in saying, "if it is a write-up, it is an abuse."

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The whole of the Federal Trade Commission investigation affords no basis for the implication that because a transaction was a write-up it was bad or that it had any undesirable social consequences simply because it was a write-up.

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There is also one other point relating to the summary table of write-ups that will be of interest to economists and the public and that is the fact that the write-ups were not computed as of the same date. The final examination dates of the investigation differed with the several companies and yet these individual totals derived at several different dates were all included in one conglomerate total. Again one wonders why, with the time and money available, the commission did not avoid such a statistical sin.

The mere listing of write-ups or the mere classification of them on the asset side of the statement is only half the story. What happened on the liability side? How much of the heterogeneous total of one and one-half billions were credited to reserves which were in effect valuation reserves and thus practically offsets? How much of the total was credited to capital surplus? How much was credited to surplus available for dividends? How much was credited to the capital stock account and remained "within the system?" How much appeared on the books of account but was in fact eliminated in financial statements issued to the public? In brief, what was the net effect and consequence? If the commission deemed it appropriate to prepare a summary table of write-ups as they affected the assets, it should have felt compelled also to make a similar computation to show the effect and consequence on the liability side. This the commission did not supply.

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From the foregoing analysis it becomes evident that the real story of the write-ups still remains to be told. Whatever it may reveal that is favorable to the utilities will only be tardy justice.

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Information incorrect, misleading

Is it not imperative, simply as a matter of common candor and intellectual honesty, that the Federal Trade Commission announce to all the world, with the same measure of publicity as it gave to its press releases on the subject of write-ups, that the summary table in Volume 72-A, which purported to reveal about one and one-half billion dollars of write-up and which was part of the information offered to Congress, quoted by Senator Norris on the floor of the Senate, and referred to by Judge Healy in the hearings on the Public Utility Holding Company Bill, is incorrect and misleading because:

1. It alleges substantial amounts as write-ups which were not in fact write-ups and in many cases were not charged as write-ups in the examination of the company.

2. There were serious inconsistencies in the treatment afforded similar incidents; in what was included and what was excluded.

3. It combines in one statistical statement amounts taken from the books of account at divergent dates and hence violates sound methods of statistical reporting.

4. The hearings were largely *ex parte* in nature; the opportunity to cross-examine witnesses was circumscribed; the opportunity to put in rebuttal was sometimes denied, as a result of which facts essential to accurate classification of incidents were often lacking.

5. The report of the commission relies on books of account, kept by several generations of bookkeepers of varied skill and experience and thus subject to errors of principle and errors of bookkeeping.

6. The write-ups were not properly classified by the commission; indefensible write-ups are included in a total which contains among other write-ups approved by regulatory commissions cognizant of the conditions and circumstances prevailing at the time.

7. The commission failed to supply the contra entries to alleged write-ups so as to enable the Congress and the public to determine even the accounting effect and consequence of write-ups.

8. There are numerous arithmetical errors in the compilation; numerous write-downs were omitted.

9. The compilation is inconsistent in reporting some write-ups gross and others net after provision for depreciation.

10. The compilation is misleading in its implication that write-ups had an adverse effect upon consumers' rates or that investors were unfavorably affected thereby. The commission in the entire eighty-odd volumes offered no specific instance where write-ups or write-downs have influenced a regulatory body in the determination of rates.

11. Accounting records alone are inadequate measures of value even when they unerringly reflect original cost.

12. The commission has included in the compilation, write-ups on property long since retired from service.

13. It includes as write-up the excess of cost over vendor's ledger value in arm's-length transactions.

14. The compilation includes duplicates arising out of the same transaction which swell the totals by a very substantial amount.

15. It includes a large amount of write-up which was never reported to the public in financial statements but which were in fact eliminated in published statements.

16. It includes as write-ups amounts never placed on books of account.

17. The commission's examiners sometimes arbitrarily treated overheads, interest on construction, and other intangibles as improper write-ups.

Or, is it too much to expect that the Federal Trade Commission will do tardy justice to the utilities in acknowledging its error? Is it not true that the character of the Summary Table 73 is such that government attorneys would not hazard the specific use of this summary in any legal controversy, knowing full well its vulnerability? But shall the Congress take notice of the character of this record upon which it had reason to rely?

Not harmful to consumers

The practice of writing up was in most instances as unwise as it was futile. It was unwise because it was certain to subject the utilities to unnecessary criticism from those who were seeking an excuse to criticize. The practice played into the hands of those antagonistic to private enterprise. It was futile because such ledger values were not of the slightest legal import in rate making. It is possible to offer explanations of motives and good reasons. But the damage to the industry caused by many of the useless and unnecessary asset revaluations is evident from the results.

I come now to my second theme—the investor's experience in public utility securities. The amount of misinformation circulated on this subject is appalling.

Out of our studies of the investor's experience with public utility securities I wish to draw three subjects for brief comment:

1. Losses due to receiverships.
2. Paper profit or losses on public utility bonds and preferred stocks.
3. Payment of dividends on preferred stock.

Allow me to present a few preliminary conclusions in connection with each of these studies:

1. *Losses due to receiverships.*

Less than $225,000,000 of electric operating company securities were involved in receivership, or less than 2 per cent of the capitalization of the industry; recent market prices indicate that as much as one-third of this amount has so far been recovered. On the other hand, approximately $1,200,000,000 in securities of electric and gas holding companies in the hands of the public were involved in receivership. This represents about one-seventh of the outstanding capitalization of the holding companies. Even in receiverships, the bond interest in many instances was continued, so that actual bond defaults were much less than the 2 per cent of capitalization would imply.

2. *Paper Profit or Losses on Public Utility Bonds and Preferred Stocks*

Annual market movement of 369 issues of preferred stock of 223 public utility operating and holding companies, not in receivership, has been traced over the six-year period from 1930 to 1936. The total cost to investors of these issues was approximately $5,000,000,000, yet they had a market value in excess of $4,200,000,000 as of December 31, 1936. Investors thus had a paper loss of about 17 per cent. Practically all of the decline in electric preferred stocks were in those of holding companies which had depreciated about one-third below issue price, while those of controlled operating companies recorded a paper loss of only 6½ per cent. There has been a substantial improvement in the prices of these securities since December 31, 1933, which date marked the low point in our survey. This improvement may be indicated by the fact that 161 issues (including 23 of holding companies) were selling above par or issue price at the end of last year as compared with only eleven issues at the end of 1933.

The study of the experience of investors with bonds of public utility holding and operating companies, not in receivership, included 688 issues with a principal amount of approximately $7,000,000,000. A paper loss of 28 per cent on these bonds at the end of 1933 had been converted into a paper profit in excess of 5 per cent by December, 1936.

The bonds of electric utilities accounted for about two-thirds of this total and showed a similar trend throughout the period.

3. *Payment of Dividends on Preferred Stock*

The preferred stocks included in our tabulation had a prior claim on earnings of approximately $300,000,000 annually, or an average rate of slightly over 6 per cent on the invested sum. Dividends were well maintained in 1930 and 1931 with no reduction or omissions the first year and only a few in 1931. By 1933, 71 per cent of the amount possible was being paid, while further reductions brought this proportion to 65 in 1935. Resumption of dividends increased the proportion to 69 per cent in 1936. (If preferred stocks of companies in receivership are included in this tabulation, the proportion of dividends paid is slightly lower than 65 per cent.) Among operating companies the proportion of preferred dividends omitted was small. These issues were mostly cumulative and arrears at this date have largely been paid up.

Insinuation and Innuendo

IT MAY be that when all the evidence is in, public ownership will be found preferable to public regulation and private ownership despite absence of evidence pointing to any industry that has treated consumers and investors better. It may also be that investigation shall show that the needs of an increasingly complex society will require public regulation if not public ownership of all the sources of food, clothing, and shelter. But such changes must not be the result of caprice or prejudice, but instead must be based on a public opinion formed by an understanding of undisputed principles, if our society is to hold together at all. Those who believe in a future for democracy must believe that the merit in a good idea can prevail without recourse to the devices of insinuation, innuendo, half truth, weasel admissions, or political racketeering.

Opportunities for Youth in Power

Pioneering, Progress - Conscious Spirit of Youth Will Find Ample Opportunity in March of Power to New Horizons

By H. P. LIVERSIDGE*
Vice-President and General Manager Philadelphia Electric Company

TWENTY-FIVE years ago a young man with an engineering education accepted as a foregone conclusion the fact that one of the most desirable openings for him was in the electric light and power industry. After a quarter of a century of development, well may the question be asked: What is the opportunity today for the young man in the electric utility industry?

Now what are the facts? Let us admit that in the past there have been abuses that sorely needed correction. Yet these abuses, which we ourselves roundly condemn and which already have been largely eliminated, are really insignificant in the face of the honest effort exerted by the large majority in the industry toward the betterment of electric service and toward the reduction of its cost to the consumer. Rates have been revised uniformly downward, even in periods of rapidly rising costs of living, so that the American people are today receiving more for their electrical dollar than for dollars spent for any other commodity. No nation in the world even approaches the United States in the wide availability of electric service. This has been accomplished through the traditional American system of encouraging individual enterprises under suitable regulation and control.

I doubt if we would have enjoyed this phenomenal expansion were it not for the fact that the industry has been in private hands—yes, and under the maligned profit system. Speaking of the profit system, I cannot forebear mentioning the homely fact that so long as the profit motive exists in this country, just so long will enterprise be measured by an economic yardstick. We may theorize to our hearts' content and draw glowing pictures of an era of production for use and not for profit, but when a nation pursues any plan in which profit is eliminated, it will find itself building up a loss that ultimately must prove a hardship to the very public it was endeavoring to benefit. Thus we may draw the obvious conclusion that if these recent competitive projects of our federal government are economically unsound, and certainly in the light of cold facts some of them give evidence of incurring serious economic losses, it should not be long before the public will become aware of the facts.

Trend only interrupted

To be sure, today, under political stimulation and unusually wide publicity, we are witnessing a furtherance of public ownership of utilities. I cannot believe, however, that this situation here in America constitutes anything but a temporary interruption of a sensible, long-term trend under private ownership. Judging from the general tendency throughout the world, it is my opinion (and this opinion is substantiated by my conversations with competent foreign observers) that eventually we will probably see the three kinds of utility organizations in this country: private, public and semi-public, the latter as illustrated by the English Central Electricity Board. But the great bulk of the industry, for many sound reasons too numerous to recite here, will remain under private ownership unless we as a nation lose our last vestige of initiative and enterprise and settle down to the dull monotony of a regimented existence.

In the future, under a more co-operative governmental régime, I am confident we shall see a marked lessening of the unreasoning antagonism which exists today between government and business. Thus we should expect to find a greatly improved mutuality of understanding: On the part of the industry, an even greater appreciation of its responsibility to the consumer; on the part of the public, a better realization of the true value of this great service—what it means to the well-being of the nation as a whole.

In the first place, the industry is relatively young. Its rapid recovery from the depression, its rapidly increasing output, its new engineering accomplishments attest to its virility. There is still a great deal of major pioneering to be done and the spirit of the industry is still the spirit of progress.

The industry is basic. It plays a fundamental part in almost every one's life. Electric energy is cheap, it is convertible into almost any other form of energy, and it is capable of economic distribution. There is no rival in sight to challenge its basic importance. But to keep its horizon broad and its spirit progressive, it must have a continuing influx of ambitious, able young men.

It may very well be that the importance of a large part of our present projected hydro-electric development will be seriously affected by the next major advance in fuel generation station efficiencies. From an economic viewpoint no further improvement of importance can be made in hydro plants; the production of electricity

*Abstract of E.E.I. convention paper.

by steam, on the other hand, is still in swaddling clothes. Draw your own conclusions!

Let us examine for a moment some of the interesting probabilities, perhaps certainties, that would result from really high efficiency generation. First, it may break the present strong bond that ties large generating plants to locations where there is a plentiful supply of circulating water. With most of the energy of the fuel converted into electrical energy, water requirements may dwindle into insignificance. Greater freedom in the selection of generating station sites would permit locations much nearer the loads served, with consequent savings in transmission and greater service reliability, particularly if the size of the generating plants could be greatly decreased from the enormous concentrations of capacities now prevailing.

Opportunities for youth

Although much has been done in the application of electronic tubes to the transmission of power, the possibilities of ultimate development in this field have hardly been touched. When low-cost electronic tubes and other equipment for direct-current transmission become available—and actual installations have been in successful operation for several years—engineers may find themselves revamping many of the substations of which we are now so proud. The enormous transformers and circuit breakers that we now take for granted may become as extinct as the cable car.

System planning involves most interesting analyses of sales and other forecasts and the examination of various methods of plant development in order to determine the best engineering solution. By determining the best engineering solution I mean engineering in its broadest sense, considering both capital and operating economies, trends of load growth, best utilization of existing plant, and last, but not least, service reliability.

More on the technical side there are many problems as yet unsolved or partly solved which beckon to the more scientific type of man. Problems in the technical field range over almost innumerable subjects, including problems of metals subjected to high pressure and high temperature, combustion and corrosion problems; and in the electrical end, the many intricate problems having to do with system stability, circuit breaker performance, insulation, lighting, and protective relays.

I do not wish to overlook the many problems encountered in everyday operations of our vast systems, analysis of operating interruptions and the diagnoses of failures of equipment and lines. These, if properly analyzed, are sources of extremely valuable information from which improvements in operating and design practices often develop. Very frequently data available from searching analysis of operating troubles and records provide the clinching facts in a choice between alternate plans.

Problems in the technical field range over almost innumerable subjects, including problems of metals subjected to high pressure and high temperature, combustion and corrosion problems, and in the electrical end, the many intricate problems having to do with system stability, circuit breaker performance, insulation, lighting and protective relays.

There are still enormous potential savings in the operation of equipment and lines at ratings fully recognizing the relation between frequency of equipment outage, characteristics of loads and their actual effect on the integrity of the equipment. We have definitely broken away from blind acceptance of "nameplate" ratings as operating limits, but there is much work to be done in securing the maximum possible economies in this direction.

There is a need for people of imagination to develop merchandising programs, advertising men to present our wares to the public and sales executives and salesmen who can successfully put these plans into operation. We are still far from making full use of proper and adequate lighting standards. On the farm there are more than 150 uses of electricity which provide a field for further economic development. Air conditioning for residences and commercial establishments offers vast possibilities and is just beginning to take its place as one of the important services of the future.

After all, the best opportunities for each young man lie in those fields for which he is best adapted by nature and training. The problem for each man is to discover the field in which he is most interested and where he can best capitalize his capacity, effort, and ambition. To this end, he should make use of all the agencies in his community that are available to help him plan a career. I know that our school systems employ vocational guidance councils to help young people in this way, and in our universities there are vocational guidance departments which are prepared to interview young people and to give them advice that will best meet their needs. Many companies of the electrical industry are trying to help young people find their best opportunities by a careful analysis at the time of employment, and by assigning each to the job he can do best and in which he can make the best progress, even going so far, in some instances, as to use psychological tests and other advanced techniques for this purpose.

L. G. Smith, Consolidated Gas, Electric Light & Power; H. F. McRell and George Fiske, General Electric; A. E. Bettis, Kansas City Power & Light, and Charles Horrell, Sangamo Electric Company

From Now On Every Home Shall Be Electrical

Nation Is Ripe for Launching of Program to Make Electrical Comfort Integral Part of Every Home

By C. E. WILSON *
Vice-President in Charge of Sales, General Electric Company

THE American people are now ready for the adoption of complete electrical service in their homes and as an integral part of any new home they buy. And, gentlemen, in that readiness lies the electric service company's most impressive opportunity fully to develop public good will through an intimate public service, and the entire industry's most dramatic opportunity to make the electrical standard of living the definite description of the American standard of living.

The natural question here is—how may we seize and fully develop this opportunity in a manner which takes full advantage of our industrial experience and the experiences gained in the complete electric home activities to which I have referred. Our industrial experience indicates that we were most successful when, with the realization of the part electrification was to play in industrial structures, architects, industrial engineers, builders, industrial equipment manufacturers, electric service companies, electrical contractors, industrial owners, and all others interested, worked together—each in his own interest, but with each interest complementary to the other. Likewise in the more recent complete electrical home activities, success has been measured by the degree to which all branches of the home building industry, under the sponsorship of the local electric service company, have co-operatively promoted the idea locally, under a well-organized plan—and the degree to which a state-wide or national background has been given to the activity.

Hence, in seizing this opportunity, the application of this experience suggests that local utilities organize and sponsor an electrical standard of living activity under a well-coordinated national and local plan which engages and serves the interest of all local branches of the home building industry—electrical, non-electrical and financial. A project of wide public interest is the magnet which crystallizes and effectuates that kind of interest, so any successful plan must be of a nature to attract wide public interest.

Picture, if you will, the electric service company with the benefit of all of its past experience, sponsoring such a local activity in cooperation with others in the local home building industry. Imagine that activity supported by all of the types of promotion found successful in such activities heretofore. Then picture behind this comprehensive program the added inducement of local awards to the home builders in its area, within a limited period, build the homes which most nearly measure up to an electrical standard of living—a practicable standard which takes into account good architectural design, sound construction, high quality building materials and equipment, sound financing, complete electrification, proper insulation and other elements which, combined, constitute a good home, small or large.

Pursuit of happiness

Next imagine behind such a local activity substantial national awards which give national recognition to several of the best electrical-standard-of-living homes throughout the country. Visualize, then, national publicity, both radio and other forms, behind these local and national activities and awards. If you have been able to follow this "moving picture," perhaps you get some conception of the view we should take of the extent of this opportunity and the kind of activity justified by it.

Maybe I am letting my enthusiasm run away with me, but everything seems favorable to the mutual success of such a dual-purpose program. Initiated now, it would come at a time when the wage level is at its highest point in years; when interest in home building is at fever heat; when the construction of over a million new homes is under way or contemplated in the near future; when the new American idea of a modern home, completely electrified, needs but a concerted push to establish that idea as the American standard of living and the objective goal of every American family; when, in this very year, concerted action can establish the electrical standard of living in the first hundred thousand homes, and thus place clearly in sight that standard in the first million homes—surely this combination of favorable circumstances offers the electrical industry its most propitious change to excel its great contributions to industry and commerce with intimate contributions of infinite social value in America's millions of homes.

* Abstract of E.E.I. convention paper.

Home Air Cleaner a 90-Watt Year-Round Load

New Electrostatic Dust and Pollen Precipitator an Immediately Applicable Product of Industrial Research Laboratory

By LEWIS W. CHUBB *

Director of Research Laboratories, Westinghouse Electric & Manufacturing Company

A NEW product which is being commercialized and which should be of interest as a load-building device is an air cleaner, a substitution product that "does it electrically."

Development of air conditioning has made people more critical of our indoor atmosphere. Cleaning of the air is one of the many divisions of air conditioning—it is not a new subject, but an important one. The smoke and dirt problem is usually associated with the industrial cities, and smoke abatement activities have been quite effective in doing away with a greater part of the factory smoke which, in the past, was so disagreeable. The "smoggy" days continue in the large cities where soft coal is burned and when there is no appreciable movement of the atmosphere. This pollution of the atmosphere is, today, not due so much to factories, but rather to the thousands of threads of smoke coming out of residential and business buildings.

Right approach to clean air

It seems as though we have gone about the air pollution problem in the wrong way. It is economically impossible to eliminate all smoke at the source. What we must do is to control the big offenders and then clean the air that is to be used in the buildings. It is like the water sanitation problem. Where the water supply for a city is taken from a stream, we do not attempt to filter and purify the full flow of the stream; only that water which is to be used is treated.

An electrostatic cleaner has been developed on the assumption that we are going to clean only the indoor air, to remove all suspended matter, dust and small smoke particles which are so detrimental to health, soil curtains, walls and tax the patience and budget of the housewife. Air washing and filtering methods commonly used take out only the coarse particles and are wholly ineffective in removing the very fine dirt which is the most detrimental. The electrical system gets them all. The Cottrell process, used so successfully for certain industrial operations, was found absolutely unsuited for cleaning air which must subsequently be breathed, because of the generation of toxic ozone and nitrogen oxides. The new system is not only free from these troubles, but it is much more efficient and effective in operation.

In discussing air cleaning, we are not only dealing with particles of numberless substances, but also the shape and size of them may vary widely. As an example, the fine dust particles passing through a 200-mesh screen have diameters up to 0.0025. For most purposes, this is very fine material, but in terms of atmospheric pollution it is extremely coarse. The most common cause of hay fever consists of particles about 0.0008 in. in diameter, while the average particle of tobacco smoke is only 0.000,0039 in. in diameter.

Precipitator segregates functions

Electrostatic precipitation consists essentially of imparting a charge to each dust particle and then attracting the particle out of the air. In former systems both functions were performed in a single chamber. The charging is obtained by a high-voltage corona discharge which produces ozone and nitrogen fixation. In our new system the charging and deposition are separated, the voltage adjusted within a critical range, the electrical field so shaped that these serious objections are eliminated and the efficiency greatly increased. This precipitator is particularly adapted for use where the cleaned air is to be subsequently breathed by the occupants of a room. However, we have already found it to be applicable in many industrial processes.

A word showing our possible interest of the device as a load builder seems to be justified. For an average dwelling the actual energy for cleaning the air circulated in the hot-air system amounts to about 10 watts. In addition to this, the losses amount to about 40 watts, and to circulate the air through the house a blower requiring about 50 watts may be used. This gives a total of a 90-watt load of the most favorable type. It must be considered as a continuous load for about nine months in the year, and when summer cooling is also used, we might consider this load the year around. Certainly this should be an attractive item for the central station.

*Abstract of E.E.I. convention paper which also described the technique of polarized light as another instance of the value of industrial development research

Progress Toward Electric Homes

Careful, Trial -- and -- Error Planning Leads to Solid and Steady Progress

By WALTER A. FORBUSH*
Vice-President Edison Electric Illuminating Company of Brockton, Brockton, Mass.

SINCE this story is only "some progress toward," and not "attainment of," electric homes, I believe that there cannot be too much emphasis on the preparation of the soil and the development of the manpower, for these things, rather than high-pressure selling or sensational methods, are the means of real progress. Logically, next come tools and specific methods, particularly cooking, for refrigeration is rapidly taking a position where its development is no longer a problem, where all outlets sell it because the public has learned to demand it.

Early ranges were of necessity comparatively expensive. We were fortunate to be able to take advantage of one of the earliest quantity purchases of a standard unit. This allowed us to be one of the very first to offer a complete range installed for under one hundred dollars. With it, in 1931, we made our first big dent in the cooking market. With this stimulation we started a trial rental plan and, with this for the last two years, have put, and at present are putting, electric ranges in our homes in steadily increasing numbers. One point in the trial rental set-up we believe to be of real advantage. We give three months free trial as a trade-in allowance for old equipment. This gets the old equipment out of the way and assures a minimum of three months trial. During this period, the customer gets real experience with the electric equipment and overcomes any difficulties that may arise from lack of knowledge in its operation. Thoroughly trained home service representatives work in the individual homes with each customer. If at the end of three months there is still doubt, the tendency is to keep the appliance, as otherwise it is necessary to get other equipment, with an outlay of cash or higher monthly payments.

Our present plan will install in the customer's home, without obligation to buy, either a range or water heater, with a monthly trial charge as low as four cents per day for a range and seven cents per day for a 50-gallon water heater. If the customer decides to return the appliance, he may do so at any time and simply lose the amount of his monthly trial payments. If during the first twelve months of the trial he decides to buy a different model electric range, all trial payments are credited on the purchase price of the new range. At the end of sixty-nine months trial rental payments cease and the appliance becomes the property of the customer. A special discount is offered to the customer who converts the trial contract to a sale during the first forty-eight months of the period.

Free service, reverts few

Free service is given customers during the life of the contract. Reverts have been few and there is so great a demand for used ranges that there is usually a waiting list for turn-ins. Something less than half of the ranges put on the lines in the last two years have been installed under the trial rental plan and the tangible result has been to bring our present range saturation to 16.5 per cent.

We have given much thought and effort to water heating and believe that we are beginning to make progress. Two major barriers have been the year-round low temperature of our water and the fact that, because of water characteristics, we cannot use galvanized tanks in the territory. After careful study, we decided that with our conditions the only type of water heating that could be justified economically was off-peak service. It starts with one cent energy for the first 300 kw.-hr. per month and follow-on use at 8 mills. Particularly in the last year we seem to be getting results and now have about 2.5 per cent saturation. More than that, the installation, once made, is staying sold and is selling the others.

When we face home air conditioning, we very definitely face New England conservatism, or perhaps we might say stubborness. Through a few commercial installations and occasional room jobs we are planting the seed and at every opportunity cultivating the growth. We are optimistic for the future, but are not unduly excited about the immediate prospects.

Our feeling today is that we are in motion, are on our way, not having attained, but pushing toward, the mark. In a three-year period we have sold 8,500 major appliances, or roughly one to every four of our residential customers. They have enabled us to increase our residential use 25 per cent. We have had moments of doubt as to whether we would possibly maintain our pace with our market increasingly sold and with the necessity of working in the lower wage scale brackets. But when we have set ourselves quotas based on what we thought to be cool, unemotional judgment, our men have cheerfully broken the quotas and begged for more.

* Abstract of E.E.I. convention paper.

Co-operation in Wiring Regulatory Standards

1. The Manufacturer's Stake

Joint Committees Can Further Co-operation Between Manufacturers and the Utilities Toward the Goal of Standard Products, Codes and Practices

By N. G. SYMONDS *

Vice-President in Charge of Sales, Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa.

THE close co-operation between utilities and manufacturers has enabled the electrical industry to proceed at an incredible speed in meeting the needs of the public. The electrical manufacturers' plants are provided with more business and they are employing more men at satisfactory wages. The utilities in turn are selling an increasing volume of kilowatts to the consumer at an ever-lowering price per kilowatt. Yet, the utilities must have manufacturing support for the increasing demands on them for lower costs, greater safety, wider range of transmission, better measuring devices, and, through all these necessities, a better understanding and readier acceptance on the part of the public.

To accomplish these desirable results the manufacturers must of necessity struggle to keep down the off-standard articles, and they are forced to recognize the problem as a national one. We must work together toward uniformity of practice, of code and of product. Joint committees have solved many problems for the industry. Through such committees, carefully chosen and broadly governed, we can come to mutual agreement on the many vexing problems of the day and of the years to come.

What are some of our mutual problems? The National Electrical Code is one, and a very vexing one indeed. For some time there have been delays and misunderstandings as to the relative positions of the manufacturer and the utility in dealing with the code. Recently there has been a change for the better. There appears to be a definite desire and urge to reconcile the differences that have existed, and through the joint committee efforts will be continued to reach a common ground. It is to the interest of each branch of our industry to support the other, after controversial items have been threshed out in committee. Broad understanding of our mutual problems must be the basis of all of our negotiations.

*Abstract of E.E.I. convention paper.

Ordinances merit encouragement

Another much-discussed problem concerns the subject of uniform ordinances. The utilities must recognize their local necessities, but they should remember that the manufacturer cannot produce consumer goods at a low price unless he can manufacture a uniform product and standardize its use and acceptance. The manufacturer recognizes the fact that perhaps a world of no ordinances would be desirable, but he is also forced to recognize that political or personal ideas often force action that cannot be avoided, and so we say that we would like to be able to stand back of and fight for, where necessity demands, a uniform ordinance to the end that a cheaper product can be produced and our stake in the utilities increased.

Another vexing problem is presented in arriving at an agreement as to the proper policing of wiring methods, the type of product, the safety of the device. If we will all submerge our own personal beliefs in arriving at a solution to this problem, I am sure we will benefit the industry as a whole and continue to do our own policing without interference from the outside, be it national or local. Certainly it is to the advantage of the manufacturer and the utility that the cost of wiring be kept as low as possible commensurate with safety, for the more houses properly wired with suitable number of outlets the more appliances will be used and the larger will be the kilowatt consumption.

The technical adequacy of rules for safe construction, installation and use must not be left in the hands of local people who do not have full knowledge of all the facts.

For example, we are about to market an electrostatic precipitator. What are the hazards and how may they be safeguarded against? Shall we de-

pend on the local power company or the municipal electrical inspector in each community to pass or reject our design? Or shall we have it examined and tested by some nationally known organization of safety experts whose findings will be accepted throughout the country? Of course we want the product to be safe. The reputable manufacturer cannot afford to compromise with safety.

Yes, the manufacturer has a great stake in the utilities, for through them his market can and will be greatly enlarged. Nevertheless, we must all realize that many selfish and disturbing elements will always exist that challenge our broad policy. Our only defense is mutual understanding and mutual co-operation. Some day, if not now, the public generally will understand that this fight is its fight also.

By and large, the manufacturers and the utilities have done a pretty fair job in accomplishing their results in an orderly manner. If we can have uniform ordinances that are sane and not selfish, inspection that is fair, reasonable profits to the utility and the manufacturer, the electrical industry will continue to forge ahead and in a continually larger sense be an industry that is necessary to mankind.

To the utility it may appear that some new proposal for adverse legislation is only a local problem. But when we see the same kind of legislation offered in dozens of widely separated communities, or in a number of widely separated states, we know it has ceased to be a local problem. Such occurrences indicate that the sponsors of such laws have a national scope, and it is only by constant watchfulness that a national acceptance of reasonable rules can be maintained.

The manufacturers will continue to work toward the co-operative solution of these problems. The utilities will do the same. We must do it as a united industry, for we cannot afford to have it done for us by some governmental agency or political bureau outside the industry. Our common problems must be solved by those who are familiar with all their aspects and implications. They must be solved fairly to the industry as a whole and to the public that we all serve.

2. The Utility's Proposal

Utilities Seek Co-operation — Definition of Common Problems Held to Be Primary Need — Suggested Program Lies Within Prescribed Code

By E. T. GUSHEE *
Vice-President The Detroit Edison Company

THE opportunity extended to me to discuss Mr. Symonds' paper is very welcome because his subject is one in which I am greatly interested. Utilities sincerely desire, and are seeking by every reasonable means, a greater measure of accord with electrical manufacturers upon those broad questions of policy which so greatly affect the prosperity and progress of the electrical industry, and are seeking that accord in the public interest. For these questions are of vital importance to the general public, whom both groups are organized to serve, and upon whose final approval the well-being of all electrical groups depends. They pay the freight with respect to many of the questions we are discussing today. If the charges are reasonable, they are cheerfully paid. If they are not reasonable, alternative methods are discovered and used. The public may not be directly articulate, but it possesses an effective veto, and, in the long run, always exercises it. It is important to remember that electricity supply is *not* a monopoly for anything except a little bit of lighting—the much-discussed one kilowatt-hour per day.

I can agree in principle with practically every point made by Mr. Symonds. A careful review of the manufacturer-utility relationship in this field leads me to believe that there is very little difference of opinion upon principle. There is, however, substantial difference in policy and programs, which is manifest by wide disagreement among technical groups. This failure of the executives of the manufacturers and the utilities to reach an agreement on a definition of the problems is responsible for the lack of agreement which has stalemated progress.

Mr. Symonds emphasizes the economic necessity of nationwide acceptance of uniform requirements as to manufacturing methods and products. This relates both to wiring and appliances and/or utilization devices. The differences which exist between us on this subject relate principally to the ways and means by which such nationally recognized standards are to be developed and brought into general use. We submit that many of these standards are ones in which we have a very real and direct interest. They cease to be private standards of manufacturing practice when it is proposed to enforce them by regulatory legislation. Therefore, utilities feel that they should have an effective part in the standardizing procedure of those items which are of concern to them and to their customers.

The whole legislative question must of necessity tie into codes, standards, and approval procedures. Whether we

*Abstract of E.E.I. convention paper.

A Program Concerning the National Electrical Code and Approval Procedure

UTILITIES believe that the best interest of the consuming public, and ultimately of every major electrical group, will be best served by a liberal, non-restrictive code containing the minimum of regulations actually necessary to protect the public against the fire and accident hazard. Unnecessary rules not in this category burden the sale, not only of kilowatt-hours, but of wiring installations and utilization devices and appliances to the ultimate disadvantage of every one. Utilities suggest that a very definite and wholehearted effort be made to reconcile the differences that now exist and to work out a code that will be mutually acceptable to both manufacturers and utilities and that they then join in securing its acceptance by other branches of the electrical industry.

Electrical Code

For purposes of preliminary discussion with manufacturers, utilities suggest that a desirable code would exhibit the following structure:

(a) The simplest possible set of rules to protect adequately against the fire and accident hazard.

(b) The rules based upon the factual record relative to those hazards and not upon imaginary risks and highly improbable conditions.

(c) The rules definitely to state the fundamental requirement to be accomplished, followed by such details as are necessary to enable the requirement to be met.

(d) The rules, insofar as it is possible, to be in such form that they will not unduly burden or prohibit departures from existing practices, when such departures comply with basic safety requirements.

(e) The rules to be in such legal form that they are suitable for enforcement by the police power in the name of public safety.

The above requirements, when considered in connection with the usual uses of the code, appear to indicate a two-part code. One part would contain the basic rules and regulations, fundamental in form, seldom requiring change, and suitable for legislative enactment, at least by direct reference. The second part would be a manual or field handbook with illustrations, drawings, etc., showing, in the present state of the art, acceptable ways and means of complying with the basic rules.

Approval Procedure

Utilities recognize the benefits which would follow upon industry-wide acceptance of a satisfactory approval procedure and would support such a program. However, utilities have been compelled to criticize many features of the existing program, as containing elements acceptable to them. The program involves test methods and approval procedures in the making of which utilities have no effective part, yet which regulate commerce in many products which utilities or their customers must buy and use. Standards approved by American Standards Association must represent a voluntary consensus of industry opinion. A standard cannot be approved in the face of a valid objection urged by a responsible interest. The sponsor must affirmatively show genuine industry accord, and this has not yet been done.

Utilities are ready and willing to participate in the development of proper industry standards and to accord American Standards Association approval to them. The standards for wiring materials should not be combined with standards for utilization devices and appliances. It is suggested that these standards fall naturally into two classifications:

(a) Basic safety standards which exhibit those absolutely essential requirements necessary for protection of the public against the fire and accident hazards. All materials, devices, and appliances must conform to these standards, and any product which conforms becomes acceptable. The safety standards shall be subject to American Standards Association approval and be recognized as required by and acceptable to the whole industry. They are to be suitable for incorporation into sales control legislation under the *prima facie* clause.

(b) Supplementing the above and being in addition thereto, there might be developed by competent joint industry action, when, as, and if required, certain standards of quality and performance. The performance standards need not, although they may, be approved by American Standards Association. They represent commercial relationships—guides for buyers and users—and are not properly subjects of legislative enactments.

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like it or not, the chances are that there will be an increasing number of state regulatory measures. We are at one with the manufacturer in our desire to protect the public by means of certain standardization of these legislative programs, but we object heartily when they are used as a means of freezing quality and unnecessarily increasing costs to the ultimate consumer. Moreover, before the legislative program can be discussed, there must be agreements with respect to the code, standards and approval procedure, which legislation is intended to enforce. It is not common practice to build the roof before you put the foundation under it.

Consumer wiring marks time

The adequate wiring of consumer premises constitutes a fundamental problem not yet solved. But the solu must be found in order that the public may have the full benefit of electrical service. New materials and methods—development and progress—are important, but not all of the answer. Burdensome rules and regulations (local and national), unnecessary restrictions not required by the factual record—all contribute unnecessary cost to the original wiring job and make it less adequate than it should be.

Mr. Symonds remarks that joint committees have contributed much toward the solution of our problems, but he adds what I believe to be a new and very important thought. He says these committees must be "*broadly governed.*" I like the idea back of this expression. For many years we have had numberless committees and reports without end, prepared with limitless labor, often to be filed away and forgotten. I submit that these committees are not wholly to blame—they are not properly governed. To my mind, the way to correct this situation is to have such committees function under an authoritative statement of principles that will properly direct their activities—a statement of broad policy agreed upon by manufacturers, utilities, insurance groups and others interested in this whole problem. The statement should define the policy and objectives in accordance with which the committees will work. With such a statement to inform our various joint committees, the detail work will flow rapidly toward a proper conclusion.

Code approval principles

We already have a number of committees conncerned with the industry Code-Approval Program. There will probably be others. But the fundamental which I wish to emphasize is the utter necessity of agreement by the N.E.M.A. board of governors and our own industry executives on a definition of principle as to the code approval and procedure and legislation —a definition which can be used for the basic instruction of committees. I propose to offer a statement (shown above) for discussion as representing policies which should guide our committees, and as a basis for discussion and agreement with other interested groups; it being understood that this program can be carried out in the framework of the present code.

Editorials

Group Promotion of Purchased Power Timely

DURING the depression, when use factors were low and demand charges loomed high in the total cost of service, when new modern equipment could be purchased at bargain prices by industrial plants and coal costs were low, these conditions favored the installation of customer-owned plants. But circumstances have changed in recent months.

Equipment prices have risen rapidly above the low of the depression. Hence fixed charges on new plant are higher. Coal has already advanced as a result of the strike settlement and may be further advanced. Wages for labor have also increased and, as a consequence, installation and operating costs are greater. Summarizing, a new industrial plant will now cost much more to build and operate than one constructed four years ago.

What are the elements when we consider the cost to industry of purchased power? Factories are now running full time and many are on overtime. Some even are operating with more than one shift. As a result, use factors have increased and the demand charge is a much lesser factor in the total bill than in those past days of low output. Obviously the unit cost of central station service has been considerably reduced. Aside from possible coal increment charges, these rates are fixed and, barring the unusual, will hold regardless of further increases in the wages of labor or the prices of machinery.

While these considerations suggest that the position of purchased power versus customer-owned plant is improving, the utility industry should not feel that, because the threat to utility service is being weakened, there is no longer any need for industry promotion of purchased power. With conditions that favor utility service becoming stronger, the opportunities to impress the economy of purchased power upon the industrial customers is greater. As the resistance of an opponent lessens, the chances of a knockout are greater.

The National Power Sales Publicity Committee, formed two months ago at a meeting in Chicago of power sales executives brought together by the Great Lakes Power Club, is endeavoring to enlist the support of the industry in a program of advertising and publicity to promote the sale of purchased power.

An advertising agency of national reputation has made a study of the possibilities in such an undertaking and has made a comprehensive presentation. This agency found two very significant reasons why the market of electric utilities was so attractive to Diesel interests. First, anti-utility propaganda has made people more receptive to Diesel promotion and, second, there is no organized resistance by utilities to the molding of industrial opinion by Diesel interests.

While competitive power will make headway where it can substantiate better economic values, the utility industry must make every reasonable effort to protect its business and not allow competitive power to win by default.

The program that the committee is suggesting is not to be confused with a public relations program. It is purely and simply a campaign to promote the sale of purchased power by new and present customers.

The cost of such a program when related to the income from industrial energy sales or to the investment behind that business is very small. It is to be hoped that electric utility executives will see the value in such promotion and appropriate the money necessary to carry it out—now.

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Master System Plan Must Be Flexible

SYSTEM planning for utilities in its broad aspects is not so terribly different from city planning, in which the objective is set down as an impressionistic architectural scheme which is expected to be modified by subsequent circumstances. In other words, a master plan is not an array of detailed blueprints that act as a straitjacket, but rather a pattern subject to advantageous remodeling. In fact, it should probably consist of several alternative fundamentals, any one of which may prove to be the most feasible solution when it becomes necessary to execute it.

Being only schematic, it could mean little unless supplemented by the conclusions and principles derived from extensive investigation of factors which will influence the particular form of evolution which proves best. The load forecast—the trend of system technology—the experience on this and on other systems—past inadequacies of the system and shifts in loading—these are the determining factors, and on their present evaluation a rigid system scheme could presumably be devised.

But flexibility is the prime consideration next to

immediate economy, and that is why a master system plan must have elasticity and adaptability. Records carefully collected and carefully analyzed are sure to be the basis for the modification to accommodate altered conditions as to territory and technology, and to a large degree they will provide the foundation for the very generic scheme which constitutes the master plan. Thus system planning is another activity that points toward more statistical compilation and analysis on the part of the system engineers. Study of this prospect will in most cases indicate that the engineering staffs are underequipped in man-power and tools to keep going the collection and analysis of system operating experience which will point the way to the economies that are being demanded of those who are responsible for applying tight money to an increasingly stringent outlay per kva. of system-wide capacity.

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A Ray of Light in Rate Making

A RAY of light in the murky atmosphere which has beclouded rate-making policies for the past five years is seen in the statement of rate-making principles recently announced by the Kentucky Public Service Commission.

The statement pertains to the delivery of energy to rural co-operatives, but it resurrects those principles of rate making which up to a few years ago were the very framework upon which all of the accepted rate forms of the industry were constructed.

Current will be delivered to rural co-operatives, says the report, at cost plus the legal rate of profit allowed upon valuation of property; co-operatives' costs will also be added. Where has there been a more succinct statement of the primary purpose of a utility rate, for all that this policy enunciates is that service to rural co-operatives shall be billed at a price which pays for the cost of rendering the service.

The Kentucky Public Service Commission joins the growing list of state regulatory bodies which refuses to condone the growing practice, as a political expediency, of picking rates for electric service practically out of thin air.

By its adherence to the fundamental principles of proper and correct rate making the Kentucky commission can automatically achieve four meritorious objectives: First, it thus exercises its true function of rate regulation in contrast to efforts to change regulatory groups into punitive agencies. Secondly, it professes its acceptance of a principle which has been common to mutually satisfactory exchanges of goods and services since business began, in that the buyer must recompense the seller. Thirdly, it can rectify the error of requiring one public utility company customer to pay for the service rendered to another. And fourthly, in this case, it can rectify the error of having taxpayers all over the United States subsidize the cost of electric service to a preferred few.

Inasmuch as the primary function of a regulatory body is to seek reasonable rates, rather than rates which are ruinously high or ruinously low, the application of this statement of rate principles to current rate regulatory procedure by the Kentucky Public Service Commission may become of great interest to those charged with the continued rendition of electric service at reasonable rates.

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Bookings for Electrical Products Surpass Those of 1929

THE electrical manufacturers are once more out in the lead. Orders booked for electrical goods during the first quarter of this year for the first time exceeded the same quarter for 1929. The figures which have just been released by the Bureau of the Census are not complete, but since they were reported by a group of electrical manufacturers which in 1929 booked more than a billion dollars worth of orders, they are undoubtedly representative of the conditions throughout the industry. The figures represent an increase over the first quarter of last year of 80 per cent and over the depression low an increase of 343 per cent.

These orders reflect not only the return of the utilities to the market for new apparatus but also an increased demand for energy-consuming equipment, which in itself will encourage the utilities to buy further.

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With Our Compliments

THIS issue is another example of the service which ELECTRICAL WORLD editors are constantly striving to give their readers. Ordinarily the annual E.E.I. convention starts on Monday and closes on Thursday, but this year the holiday caused the convention to start and end a day later. This one day brought the last session a full day after our regular closing time for final corrected forms—and in a city a thousand miles away.

To meet this situation and assure our readers receiving a full report at the usual time, every means of fast production and transportation was used. Four editors covered the convention. Photographs were rushed through, and in a few hours from the time of their taking the finished halftones were ready for the airplane to the printer. Copy was wired, telephoned and on Thursday one of the editors flew to Albany, where the print shop is located, in order to co-ordinate everything, minimize errors and receive over the wire the report of the final sessions. Thus the convention had hardly closed before the presses were rolling with the full story.

News OF THE WEEK

Supreme Court Refuses to Grant Review in Utility Act Decision

Ruling allows case of Electric Bond & Share to go to Circuit Court of Appeals — TVA loses plea for review of suit of nineteen utilities — Court to review PWA power loans and grants

The Supreme Court last Tuesday denied Electric Bond & Share Company and its affiliated companies a review of the United States District Court decision upholding the registration provisions of the utility act.

The effect of the order of the court is to refuse to hasten constitutional consideration of the registration provisions. The court rejected a joint plea of the government and the utilities that it consider the case, although it has not been decided by the Circuit Court of Appeals.

Upheld registration

Federal Judge Julian W. Mack, in ruling on the case when it was tried last November, held that the registration provisions were constitutional and that the act was separable.

The Alabama Power Company and Iowa City Light & Power Company were granted a Supreme Court review of a District of Columbia Appeals Court ruling upholding constitutionality of the PWA power program.

The two utilities contended before the court that the lower court was in error in holding they could not challenge the legality of the actions of PWA officials and in holding valid the acts authorizing PWA loans and grants for municipal power plants in competition with utilities.

TVA plea denied

The TVA was denied a Supreme Court review of a Circuit Court decision sending back to a district court for trial on its merits the case of nineteen electric utilities which sought to test the constitutionality of the TVA.

Recently a Circuit Court of Appeals dissolved the injunction granted by Judge John Gore halting the power activities of the TVA and remanding the case back to the lower court for trial. The ruling of the Supreme Court means that the case will not go to trial in the near future.

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Texas Utility Plans New Plant

Dallas Power & Light Company plans to start construction of its new power plant at Mountain Creek early in June, according to Perry Davis, construction chief. The first unit of the plant, of 35,000-kw. capacity, will be completed about April, 1938. The remaining units to be installed will bring the total capacity to 150,000 kw. To provide an adequate cooling system, the company has built a dam and lake at a cost of more than $2,000,000.

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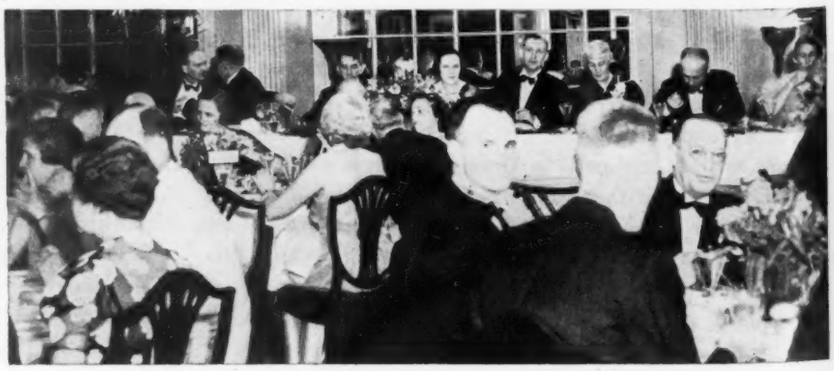
45-Mile Line to Tie Two Utility Systems

Mississippi Power Company will start construction on a 45-mile line from the Mississippi-Alabama line to Landon, Miss., to connect with the system of Alabama Power Company, according to B. E. Eaton, president.

Steel towers 100 ft. high will be used to carry the line across the Biloxi River. An outdoor type transformer station will serve to permit power transfer with the 22,000-volt Mississippi coast system extending from Kreole to Waveland.

With completion of these new facilities, Mr. Eaton said that increasing power requirements of the area can be supplied for a number of years without major system changes.



L. to R.—Foreground: H. L. Welch, Mississippi Power; J. P. Connelly, South Carolina Power; E. A. Wilson, Alabama Power; Head table: W. E. Mitchell, Georgia Power; J. W. Hancock, Appalachian Electric Power; Dr. Gus W. Dyer, Vanderbilt University; Mrs. J. M. Barry; L. V. Sutton, Carolina Power & Light; Mrs. W. E. Mitchell; J. M. Barry, Alabama Power, and Mrs. L. V. Sutton

CONVENTION—Members of the Southeastern Electric

Sutton Holds Record of Utilities One of Development and Service

Cites accomplishment in southeastern states in increasing wider use of electricity — Allen says next ten years will be golden era for electrical merchandising — Mitchell named new head

Opinion that the record of utility companies in the Southeast is one of development and the rendering of a splendid service at a continual lowering rate was expressed by L. V. Sutton, president of the Southeastern Electric Exchange, to the 300 members attending the fourth annual convention at Hot Springs, Virginia, last week.

"At the present time we are carrying on and accomplishing an outstanding job in the face of the greatest difficulty," he said. "If we are given fair treatment or have a fair chance, we will give a good account of ourselves."

Greater electric use

The achievements of companies in the eight southeastern states referred to by Mr. Sutton consist of the following: Average domestic usage 933 kw.-hr., compared to national average of 725 kw.-hr.; 1936 increase 104 kw.-hr., double the national increase of 51 kw.-hr.; gain in number of customers 6 per cent, or double the rate of increase for the nation.

Members faced a crowded schedule of business sessions based upon sales, engineering and operating and accounting, with discussions by utility leaders, electrical manufacturing executives and distinguished guest speakers.

"I am confident that the next ten years will prove to be the golden era for electrical merchandising," A. E. Allen, vice-president Westinghouse Electric & Manufacturing Company, told members after citing reasons why appliance saturation is no more of a hindrance than the bugaboo of automobile saturation.

The possibilities of the electrical dealers' organizations as sales builders was stressed in an address and discussion of "Kilowatt-Hours from Man-Power," by J. S. Sutherland, manager sales promotion division, Alabama Power Company, and S. P. Vecker, general sales manager Carolina Power & Light Company.

Sales and merchandising

Further discussions of sales and merchandising were contributed by Jesse P. Johnson, manager commercial cooking, refrigeration and air-conditioning department, Tennessee Electric Power Company; Eugene Vinet, commercial engineering department, Edison General Electric Appliance Company; Merrill E. Skinner, chairman Better Light-Better Sight Bureau and vice-president Buffalo, Niagara & Eastern Power Corporation, and R. R. Denison, Farmers Rural Utilities, Inc., Bowling Green, Va.

Philip Sporn, vice-president in charge of engineering American Gas & Electric Company, New York, talked on "Service Standards and Operation of Rural Lines." The importance of good service to the farmer, his greater dependence upon electricity than even the urban dweller, coupled with the present simplification of rural construction, led Mr. Sporn to the conclusion that "I believe we shall get further in the long run by gradual progress. The important thing is definitely maintained progress. That is the policy most of us have been following since the beginning of the industry, going back more than five decades, and we cannot do much better than to continue to adhere to it."

W. E. Mitchell, Georgia Power, was elected president to succeed L. V. Sutton. Alex Speer, Virginia Public Service; Bryan C. Hanks, Florida Power & Light, and J. A. Longley, Tennessee Electric Power, were elected vice-presidents, and John W. Talley executive secretary.

J. G. Holtzclaw, Virginia Electric & Power; C. A. Collier, Georgia Power; Thomas Fuller, Westinghouse Electric & Manufacturing; E. H. Ginn, General Electric; J. W. Han-

L. to R.—J. E. Jackson, Appalachian Electric Power; John B. Taylor, Appalachian Electric Power; Mrs. John B. Taylor; A. R. Hines, General Electric; W. I. Whitfield, Appalachian Electric Power; Mrs. A. R. Hines and J. W. Hicklin, General Electric

L. to R.—S. P. Vecker, Carolina Power & Light; Charles E. Ide, Tennessee Light & Power; Mr. and Mrs. H. G. Dooley, "Electrical World"; Edward E. Potter, General Electric Lamp Co.; J. G. Bariceas, Virginia Public Service

L. to R.—Mrs. Herbert Markle; Fitzhugh Lee, Carolina Power & Light; Mrs. W. F. Ficklen; Mrs. Philip Sporn; Mr. and Mrs. James Smith, Appalachian Electric Power; Philip Sporn, American Gas & Electric

Exchange gathered last week at Hot Springs, Va., for their annual meeting

cock, Appalachian Electric Power; E. L. Godshalk, South Carolina Power; Charles E. Ide, East Tennessee Light & Power; J. M. Barry, Alabama Power; R. L. Lindsey, Tennessee Electric Power; L. P. Sweatt, Mississippi Power, and A. W. Higgins, Florida Power, were named directors at large.

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ImprovementsPlanned by Baltimore Utility

Consolidated Gas, Electric Light & Power Company of Baltimore will spend $7,248,942 this year for property additions, betterments, replacements, according to Herbert A. Wagner, president. This will be divided $123,155 for generating plants, $2,904,723 for substations, $2,765,045 for transmission and distribution and $1,674 for miscellaneous, all in the electric division. All other expenditures are estimated at $1,454,345.

In addition to the regular activities of the company's domestic merchandising department and the new-business department, which is engaged in the promotion of electric power used by industrial and large commercial customers, the company is carrying on a series of electric load-building and appliance campaigns, Mr. Wagner said.

The campaigns now under way include electric range rental, residential lighting, electric water heating and rural electric wiring and fixtures. Substantial progress is reported with a good volume of business secured.

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Continue Seaway Discussions

Conferences with Canada regarding the St. Lawrence power and navigation project are continuing, it was disclosed in a letter to Representative Walter T. Andrews of Buffalo from President Roosevelt. The President said that "no stone will be left unturned in the efforts of this government to reach a satisfactory agreement at the earliest date." He pointed out that consultations are of an exploratory character with the object of reaching a basis of mutual agreement that can be incorporated in a treaty.

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Plan Refrigerator Campaign

El Paso Electric Company is cooperating with dealers in a six weeks electric refrigerator campaign with a quota of 500 units. Special bonuses will be paid by dealers to salesmen during the campaign.

REA Co-operative Forced to Raise Electric Rates to Meet Expenses

Members of Texas project agree to increase after president tells them that system has not been doing so well — New rate sets minimum monthly bill at $2.37, which includes 25 kw.-hr.

Members of the Bartlett Community Light & Power Company, Texas, REA project, have been informed by W. R. Janke, president, that electric rates will be raised in order to obtain sufficient revenue to make the project profitable and to meet obligations.

At a meeting held in early April, attended by about fifty customers, a resolution was adopted increasing rates in order to meet the necessary expenses of operating the company and to meet obligations. It was also agreed that as soon as a surplus is accumulated rates are to be reduced.

Minimum bill $2.37

Members have now been advised that, effective with the May billings, the minimum rate for each customer will be raised to $2.37, including 25 kw.-hr., as against the former minimum of $1.10 for 7 kw.-hr. The 5 per cent discount allowed for payment by the tenth of the month remains in force.

The new increased rate compares with the original rate charged by the co-operative as follows:

New Rate		Old Rate	
First 25 kw-hr.	$2.37	First 7 kw-hr.	$1.10
Next 40	5.0c	Next 13	7.5c
Next 90	3.0c	Next 45	5.0c
Excess	2.0c	Next 90	3.0c
		Excess	2.0c

Mr. Janke pointed out to members of the REA co-operative that they were advised last December that the electric system had not been doing so well. "We have the lowest minimum rate of any rural line in the country, but a number of our customers have not been using as much electricity as we had hoped," he said.

"For the past five months we have collected barely enough money to pay REA and have been unable to pay the city anything. We have waited, hoping that the minimum users would do their share."

Power from municipal

The REA co-operative receives its power from the municipal plant, which reads the meters, collects the bills and maintains the lines and services on the distribution system of the co-operative. It is reported that the wholesale rate is between 2 and 2.5 cents a kilowatt-hour, with total consumption taken as the sum of the individual customer's meter readings.

REA releases indicate that the Bartlett REA project serves Bell and Williamson Counties and it is reported to have borrowed a total of $45,500 in three allotments to build 59.5 miles of line to serve 202 customers.

The Bartlett municipal system has a Diesel plant, which operates in competition with the Texas Power & Light Company.

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Adopt Production Schedules to Speed REA Projects Work

In a survey of progress John M. Carmody, REA Administrator, states that the REA has now passed from the experimental stage to a program of planned production. Mr. Carmody pointed out that a five-month production schedule for handling application has been worked out.

As a means of speeding work on REA projects the schedule, in normal cases, will permit energization of rural lines and the serving of customers within five months after the application is received by the REA. Construction is scheduled to start within three months after funds are allocated for the project.

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Changes Gas Range Sales

Consolidated Edison Company of New York, Inc., will, after July 1, discontinue the sale of domestic gas ranges, which will thereafter be merchandised under the company's co-operative merchandising plan, which has been in operation since 1935.

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EHFA Closes New Contract

Electric Home and Farm Authority has announced that a contract has been closed with the Menard Electric Co-operative, Petersburg, Ill.

Account System for N. Y. Utilities

A new system of accounts to be followed by electric corporations with revenues of more than $250,000 has been prescribed by the New York Public Service Commission. A separate system for utilities with revenues between $25,000 and $250,000 a year is being drafted. The new system is to become effective January 1, 1938, but companies which desire to keep their accounts under the new system commencing as of January 1, 1937, may do so.

The new accounting system was patterned largely after the prior system prescribed by the commission. In only a few instances are there provisions actually in conflict with the federal system, such as to require a company to account in different ways for the same property transaction.

Depreciation account

The new system fails to prescribe any specific method of determining depreciation. In the 1934 system, which was the target of legal attack, the straight-line method was prescribed. The courts ruled that the commission exceeded its authority in this respect and was exercising, unlawfully, a voice in the management.

Under the new system utilities are required to show original cost separately and that any excess actually paid over original cost, less accrued depreciation, be shown in a separate account. There is no requirement that any portion of this amount be written off, but there is a provision that the company submit its program for depreciation, amortization, or other disposition thereof. Provision is made, however, that amortization of amounts in this account may be charged to operating expenses only on approval of the commission.

The commission, in the new system, seeks greater clarity in the breakdown of accounts designed to simplify the precedure in connection with charges to plant account, construction, plant purchases and adjustments.

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Albuquerque Gas & Electric to Expand Plant Facilities

Arrangements for the purchase and installation of additional electric and steam generating equipment, to cost $300,000, have been completed by the Albuquerque Gas & Electric Company, according to Arthur Prager, vice-president and general manager.

The new equipment to be installed includes 5,000 kw. of additional generating capacity. Installation of the new boilers and generators will require an addition to the present building. The company recently purchased three acres adjoining its plant.

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New Lights for Highway

The State of Minnesota will furnish 25 lighting units for installation on the outskirts of Lake City, Minn., on U. S. highway No. 65, according to General Electric engineers who designed the units. Along the residential area on the highway fourteen ornamental incandescent fixtures will be installed. Beyond the residential zone eleven sodium units will be used. Poles, wire and labor will be furnished by Lake City, which will also operate and maintain the 25 units. They are expected to be in operation by June 15.

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Rural Lines Planned by Wisconsin Utility

Wisconsin Public Service Corporation plans construction of 80 miles of rural power lines in Menominee County, Michigan, at an estimated cost of $72,000, according to L. P. Works, local manager. It is expected that 200 customers will be signed on the new line, the largest rural extension program considered by the company in the county.

Cost to the company in reaching each farmer with the power line is estimated at $400. Each farmer would pay $4 a month for three years under the contract and receive 50 kw.-hr. a month for that cost. This is more liberal than farmer contracts.

Farmers in the district in which the lines would be built would be offered contracts for hauling poles, digging holes and erecting the poles. Poles will be placed 400 feet apart, instead of 225 feet, and the wires will be in a vertical position instead of on cross-arms.

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Court Approves New Set-Up

The reorganization plan of the Municipal Service Company, a subsidiary of the Associated Gas & Electric Company, under section 77-B of the National Bankruptcy Act was approved by Judge Kirkpatrick in United States District Court in Philadelphia. The plan provides for the taking over of Municipal's assets by the N.Y.-Pa.-N.J. Utilities Company, another Associated affiliate, and a scaling down of the capital structure.

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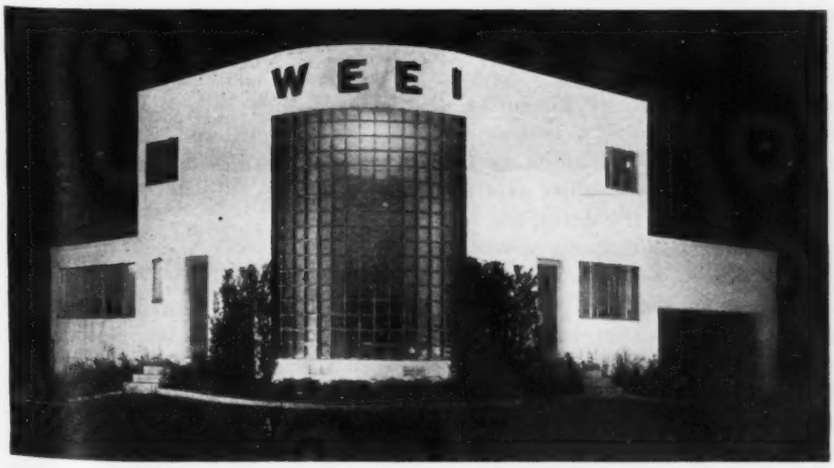
New Abitibi Plan Offered

A new plan for reorganization of the Abitibi Power & Paper Company has been offered to the liquidator by Harrison & Company, investment dealers of Toronto. The offer is independent of other attempts to terminate the present receivership. Under the plan hold-



FLOODLIGHTING—Use of two 1,000-watt units equipped with special convex glass to provide even distribution of flux, Boston Edison's new 5,000-watt radio transmitting station at Medford, Mass., utilizes the latest in illumination. The station is leased to Columbia Broadcasting System

ers of common shares would be given warrants to buy convertible debentures to raise $10,663,546 of new money for the company. The debentures would be underwritten by Harrison & Company, who would buy any of the debentures not taken up by shareholders.

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Plan Organization of Utility Employees

A campaign to organize public utility workers on a nation-wide scale has been signified by John L. Lewis, chairman of the Committee for Industrial Organization. The C.I.O. will assign twenty organizers to the job of bringing the utility workers into the union. Actual work will be done through the United Electrical and Radio Workers of America, headed by James B. Carey, president.

Mr. Carey pointed out that 350,000 utility employees of all types would be affected by the drive. "More than 100,000," he said, "are now in C.I.O. unions, which will eventually be under the U.E. & R.W., which has a membership of 80,000."

A charter is to be issued for the Public Service Employees' Union to embrace employees of the Consumers Power Company.

Employees of Virginia Electric & Power Company have voted to form an independent workers' organization for the purpose of collective bargaining. Walter E. Holtzback, clerk in the general office, has been chosen general chairman of the group. It was said that the organization will not affiliate with either the C.I.O. or the A.F. of L.

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Plans $100,000 Program

Wisconsin Hydro-Electric Company is planning a $100,000 construction program to include the replacement of the 22,000-volt transmission line servicing Amery, Wis., with a new line connecting with the Black Brook and Clear Lake circuit.

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Acquires New Properties

Savannah Electric & Power Company has taken over the properties of the Coastal Public Service Company in Screven and Effingham counties. The 300 customers of Coastal Public Service will be served at the promotional rates now prevailing in Savannah.

Demonstrate Progress of Electric Industry

Demonstrations showing the advancement made by the electrical industry, its contributions to present recovery and the avenues being opened for greater expansion of service to the public provided the major interest at the recent annual convention of the Pacific Coast Electrical Association held at Pasadena, Calif., which was attended by more than 670 delegates.

Richard E. Smith, executive assistant Southern California Edison, and chairman of the convention, provided the series of demonstrations covering various phases of the industry's operations to prove both its virility and its tremendous future. F. B. Lewis, vice-president and general manager of Southern California Edison and president of the association, stated that the industry is contributing to the progress of the country to a degree but little realized by the general public.

Mr. and Mrs. Richard E. Smith, chairman and hostess of the Pacific Coast Electrical Association convention

Dr. Phillips Thomas, Westinghouse, utilized actual problems presented to the research laboratory for solution to demonstrate equipment developed as a result of investigations. The electrostatic air cleaner suitable for small air-conditioning units, a new syncroscope for study of high-speed mechanical motion, a super-sensitive photronic device for industrial control, the Ignitron, and electric tube were among his demonstrations.

H. Freeman Barnes, General Electric, utilized dramatics and charts to demonstrate the need for higher levels of illumination. He said that a new unit which will give high-intensity lighting without glare will soon be released.

New applications of electricity on the farm were discussed by Joe K. Ellsworth, University of California. E. F. McNaughton, California Railroad Commission, urged greater usage of informal investigation as a means of utility regulation as being less costly than formal hearings.

Raymond M. Alvord, manager of General Electric Pacific division, was elected president to succeed Mr. Lewis. Other officers elected included P. M. Downing, vice-president and general manager Pacific Gas & Electric, and A. L. Stone, Los Angeles electrical contractor, vice-presidents. Norman Sutherland, Pacific Gas & Electric, was elected treasurer.

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Record Output Made in Canada in 1936

Electric power production in Canada attained a new high during 1936, 8.9 per cent above 1935, which had in turn been a record output. The total was 25,493,000,000 kw.-hr., compared with 23,404,000,000 in the preceding year. The highest output prior to the recent trade recession was 18,093,000,000 kw.-hr. in 1930 and production dropped to 15,862,000,000 kw.-hr. in 1932. The increase since the commencement of recovery in 1932 has been 61 per cent.

The capacity of hydro-electric turbine installations at the beginning of the present year was 7,945,490 hp., the increase during 1936 being about 36,000 hp. The increase in the last decade was nearly 75 per cent, having risen from 4,549,383 hp. in 1927.

In capacity of hydro-electric installations, Canada stands second only to the United States and exceeds Italy, the third in rank, by 2,000,000 hp.

The known water powers of the Dominion are conservatively estimated as sufficient to provide for a commercial installation of 43,700,000 hp., of which only 18.2 per cent has so far been utilized.

The figures here quoted are those of the Dominion Bureau of Statistics.

•

Ohio Issues Authorized

Ohio Utilities Commission has authorized the Ohio Public Service Company to issue and sell at not less than par the following issues: $28,000,000 of new first mortgage 4 per cent bonds; $1,600,000 of 5½ per cent preferred stock to supplant a similar issue previously authorized but not issued, and $1,000,000 in unsecured serial notes bearing interest not exceeding 4½%.

Lower Rates Assured Arkansas REA Groups

The problem of securing lower power rates for REA co-operatives in Arkansas appears to have been solved as a result of the offer of Harvey C. Couch, president of Arkansas Power & Light, to sell current to rural co-operatives at the "lowest rate in the United States."

Release of approximately $2,000,000 in federal funds for the state appears likely as a result of the action. At a conference with Governor Bailey it was stated by Mr. Couch that his company would wholesale current to co-operatives at 1.23 cents a kilowatt-hour.

Mr. Couch offered his rate under a 75-25 plan under which the utility would build distribution lines for the co-operatives, furnish consumers with current at prevailing rates and return 25 per cent of the monthly bills to the co-operatives with which to repay government loans used to build the lines.

"The REA now agrees that we can build lines cheaper than it can build them by contract," Mr. Couch said. "The cost of distribution is what is going to make the co-operatives fail—if they do fail—not the cost of power."

•

New Rural Lines Authorized

Duke Power Company has notified Dudley Bagley, director of the Rural Electrification Authority in North Carolina, that it has authorized construction of more than 306 additional miles of rural power lines to serve 1,794 customers.

•

To Make Power Extensions

Public Service Company of Oklahoma will make extensions to its power system in northwest Texas and western Oklahoma totaling $1,500,000 during the remainder of this year and the early part of 1938, according to Fred W. Insull, president.

•

Seeks to Absorb Subsidiary

Citizens Utilities Company, Minneapolis, Minn., has filed an application under the Holding Company Act asking the approval of the commission for the acquisition of certain electric light and power utility assets and business in Sherman and Thomas counties, Kansas. The applicant would acquire such assets and business from the Public Utilities Kansas Corporation, which is a wholly owned subsidiary of the applicant. Applicant states that it is simply absorbing its wholly owned subsidiary and is assuming all its obligations and liabilities.

•

Britain Leads in Seven-Year Growth

Comparative statistics of the estimated electric power output in twelve leading countries during last year as against 1935 and 1929, compiled from figures published in the annual report of the Société Financièré de Transports et d'Entreprises Industrielles (Sofina) of Brussels, are given in the accompanying table. It will be seen that as against 1935 Germany shows the largest increase but that during the seven-year period Great Britain has made the greatest progress. It will be noticed that the figures for Spain, Italy, Austria, Russia, Brazil and the Scandinavian countries are not included.

Estimated Electrical Energy Output

(In millions of Kw.-hr.)

	1929	1935	1936	% Increase 1936 over 1929
Argentine	1,212	1,817	1,946	60.5.
Belgium	4,084	4,710	5,155	27.8.
Canada	17,963	23,405	25,488	41.9.
France	14,352	15,703	16,143	12.5.
Germany	30,660	35,692	41,296	34.7.
Great Britain..	17,563	25,493	28,845	64.2.
Mexico	....	2,064	2,291	....
Holland	1,604	2,207	2,336	45.6.
Poland	3,048	2,820	3,120	2.4.
Portugal	240	356	370	54.1.
Switzerland ..	5,300	5,692	6,051	14.2.
United States..	91,421	93,656	106,950	17.0.

•

Taxes Equal $8.42 a Meter

Combined state and federal taxes assessed against the Public Service Company of Indiana, the Northern Indiana Power Company and the Traction Light & Power Company on their operations totaled $2,216,421 last year, according to J. N. Shannahan, president. On the basis of the number of meters in operation last year, the tax payment is equivalent to $8.42 a meter, or 70 cents a month, he declared.

Store Lighting Plan Urged by E.E.I. Group

A nation-wide program for aggressive promotion of store lighting is being presented to the electric utility industry by the Edison Electric Institute sales committee. Constructive suggestions for an organized plan of action and examples of profitable activities are contained in a booklet being sent to all companies.

The sales committee expresses the belief that the commercial lighting operations during the past year can be extended to all utility properties with equal profit and success. It was pointed out that the 1936 survey on store modernization needs, shown in a market research sponsored by the U.S. Department of Commerce in 8,108 retail stores and service establishments in 23 selected cities, revealed that 66 per cent of the stores studied are in need of electrical advertising and that at least 29 per cent of the stores need better lighting and new lighting fixtures.

It was stated that the recently completed survey by the *National Real Estate Journal* among its subscribers covering 165,820 existing stores reveals that nearly 12,000 will be remodeled or modernized at an approximate cost of $17,600,000. This same source further indicates that there will be a 44 per cent increase in new store construction, involving an expenditure of more than $46,000,000. The F. W. Dodge Corporation estimates that total store building volume this year will exceed $100,000,000. This offers a vast market for better lighting, it was said.

•

Utility to Spend $63,000

Approximately $63,000 will be expended by the Arkansas Power & Light Company to rebuild and recondition the wiring system at Newport, Ark., and to increase the capacity of the local substation there. It is also planned to construct 15 miles of rural lines to serve additional rice wells in Jackson County.

•

Increases Common Dividend

Duke Power Company has declared a dividend of $1.25 on the common stock. Previously 75 cents quarterly was disbursed.

TVA Power Contracts Seen Act Violation

Opposition to the power contracts made by the TVA with giant metallurgical and chemical companies has been expressed by Dr. John R. Neal of Knoxville, who expressed the fear that such contracts might deprive the people of the benefits Congress intended in passing the TVA legislation. Dr. Neal also stated that such procedure would be a violation of the Norris act.

Dr. Neal was in Washington recently, where he advocated inclusion of the proposed Watts Bar and Coulter Shoals dam projects in the TVA program for the next fiscal year.

The power contracts referred to by Dr. Neal included those of Aluminum Company of America and the Monsanto Chemical Company.

•

British Columbia Electric Plans New Generating Unit

Construction of a second unit of the Ruskin power development of the British Columbia Electric Railway Company is now under way. The new plant will add 47,000 hp. to the system and the installation will bring capacity to 97,000 hp., although ultimate capacity will be 188,000 hp.

The generator will be a vertical machine supplied by the Canadian General Electric and rated 44,000 kva., three phase, 13,800 volts, 60 cycle, 120 r.p.m. It will be directly connected with a Kingsbury thrust bearing and direct-connected exciter unit. The company is also supplying the transformers.

•

Alabama Power Adds to Load

Alabama Power Company during the first four months this year added 1,790 hp. load to its lines as a result of 28 installations of air-conditioning units. This compares with 73 installations with 1,601 hp. on the lines at the end of 1936.

•

Invalidation of Ordinance Sought by Indiana Utility

Officials of the Northern Indiana Public Service Company are seeking to invalidate a Crown Point city ordinance, alleged to have grown out of a controversy between public and privately owned electric utilities.

The ordinance requires electric and telephone companies to place their wires underground by January 1, 1939. It also is so worded that it will be practically impossible for the company to install lines leading to the county buildings at Crown Point. The controversy started after the company recently underbid the municipal utility on a contract to provide electricity for county buildings.

•

Work Starts at Grand Forks

Work has been started on installation of a 3,000-kw. electric generating unit and new boiler equipment at the Grand Forks, North Dakota, plant of Northern States Power Company (Minn.) Completion of this installation will increase the electric generating capacity of the plant to 8,975 kw.

Meetings

Wisconsin Municipal Utilities Association—Convention, Elks Club, Manitowoc, Wis., June 17-18. John J. Jedwabny, secretary, Menasha, Wis.

Economic Conference for Engineers—Seventh annual meeting, Stevens Institute of Technology Engineering Camp, Johnsonburg, N. J., June 18-26.

Canadian Electrical Association—Annual convention, Banff Springs Hotel, Banff, Alberta, June 21-24. B. C. Fairchild, secretary, 804 Tramways Bldg., Montreal, Quebec.

American Institute of Electrical Engineers—Summer convention, Milwaukee, Wis., June 21-25; Pacific Coast convention, Spokane, Wash., August 30-September 3. H. H. Henline, national secretary, 33 West 39th St., New York, N. Y.

National Association of Credit Men—Annual convention, Hotel Stevens, Chicago, Ill., June 21-25.

Public Utilities Advertising Association—Annual convention, Hotel Pennsylvania, New York, June 22. T. H. Spain, chairman, Public Service Corporation, Newark, N. J.

American Society for Testing Materials—Annual meeting, Waldorf-Astoria Hotel, New York, N. Y. June 28-July 2. R. E. Hess, assistant secretary, 260 South Broad St., Philadelphia, Pa.

International Association of Electrical Inspectors—Joint annual meeting, northwestern and southwestern sections, Hotel Utah, Salt Lake City, August 23-26, F. D. Weber, secretary-treasurer, northwestern section, P.O. Box 70, Portland, Ore. H. L. Gerber, secretary-treasurer, southwestern section, 914 Merchants Exchange Building, San Francisco, Cal. Eastern section, Hartford, Conn., September 27-30. Joseph P. Rohan, general chairman, Hartford Building Department, Hartford, Conn.

Commission Grants Snake River License

Federal Power Commission has announced that the application for a major license by the city of Idaho Falls, Idaho, for the construction, operation and maintenance of a hydro-electric development on the North or Henry's Fork of the Snake River at Upper Mesa Falls, in Fremont County, has been approved and an order for issuance of the license has been made. Included in the project will be a power house with 5,000-hp. installed capacity. The city will also construct a 66,000-volt transmission line about 65 miles long from the plant to the city.

An additional step in the development of power at Upper Mesa Falls also approved by the commission was the installation of a second generating unit of 5,000 hp. License for the project will be issued for a term of 50 years.

•

Memphis Sells Bond Issue

The city of Memphis has sold a $3,000,000 issue of bonds to defray the cost of constructing a municipal distribution system for TVA electricity. The only bid, one providing for an interest rate of 3¾ per cent, with a premium of $31,800, was submitted by a syndicate headed by the Mercantile Commerce Bank & Trust Company of St. Louis. The distribution system will cost approximately $9,000,000 and the bonds just sold are the first third of a $9,000,000 issue authorized in a referendum vote.

•

Westchester Loan Sought

Application has been filed by the Westchester Lighting Company with the New York Public Service Commission for approval of the issuance and sale of $25,000,000 in mortgage bonds to be guaranteed by the Consolidated Edison Company. The Consolidated joined in the application.

•

To Acquire New Property

Governor Lewis O. Barrows has signed a bill which authorizes the Kennebec Reservoir Company to sell its property and franchises to the Central Maine Power Company. The reservoir company, by its 1927 charter, is empowered to build a large storage reservoir on Dead River waters, at an estimated cost of $3,000,000.

Output Continues to Increase

Another moderate advance was made in energy production by the electric light and power industry during the week ended May 29, reported as 2,206,713,000 kw.-hr. by the Edison Electric Institute. The increase over the like week a year ago was 12.9 per cent and therefore in line with the figures for the past two months. Present operations are at the February level, 60,000,000 kw.-hr. above the low week at the beginning of April and only 58,000,000 kw.-hr. under the peak in the middle of January.

Regional percentages over 1936 in the chief industrial areas range between 14 and 17, with an upward trend in the Middle Atlantic, slightly narrowing gains in the Central industrial states and firmness in New England.

Weekly Output, Millions of Kw.-Hr.

1937	1936	1935
May 29...2,207	May 23..1,955	May 25..1,696
May 22...2,199	May 16..1,962	May 18..1,700
May 15...2,195	May 9..1,948	May 11..1,702
May 8...2,176	May 2..1,929	May 4..1,698
May 1...2,194	Apr. 25..1,933	Apr. 27..1,673
Apr. 24...2,188	Apr. 18..1,915	Apr. 20..1,702

Per Cent Change from Previous Year

Region	Week ended May 29	Week ended May 22	Week ended May 15
New England.....	+14.1	+13.1	+14.2
Middle Atlantic....	+14.2	+12.7	+11.0
Central Industrial...	+14.9	+15.1	+14.9
West Central.....	+ 6.9	+ 7.1	+ 6.3
Southern States.....	+16.8	+15.1	+16.2
Rocky Mountain....	+21.2	+25.1	+24.8
Pacific.....	+ 6.6	+ 4.8	+ 4.2
United States.....	+12.9	+12.1	+12.7

Merger Plea Filed by Washington Units

The Federal Power Commission held a hearing this week on the joint application of Chelan Electric Company and the Washington Water Power Company for approval of the sale and disposition of all the facilities of the Chelan company to the Washington Water Company and transfer to the latter company of the licenses issued for two power projects in Idaho and one in Washington.

Application set forth that the Chelan Electric Company is engaged solely in the generation and sale at wholesale of electric energy, and that it has no electric customers other than the Washington Water Power Company, to which it sells at wholesale the entire output of its three hydro-electric generating stations.

•

New Midland Utilities Plan Proposed by Stock Group

Committee for holders of Midland Utilities Company 6 and 7 per cent prior lien stocks has prepared a plan for reorganizing the bankrupt Insull holding company. The plan will not be submitted in court, but will be used as a basis for discussion of rehabilitating Midland Utilities, the committee stated.

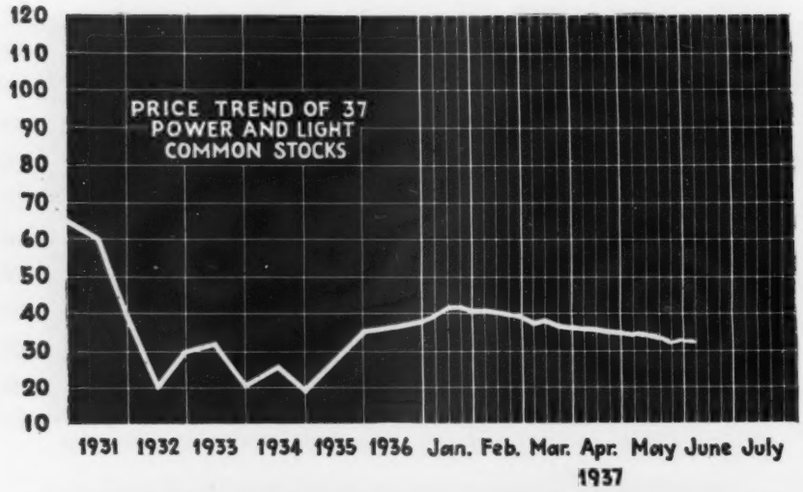
The plan provides for organizing a new company having an issue of fifteen-year 4 per cent sinking fund debentures for secured creditors, an issue of fifteen-year income notes for sinking fund provisions and stock for unsecured creditors, and a total issue of 300,000 shares of common stock, $20 par value, and for payment of certain debts of the debtor corporation in cash.

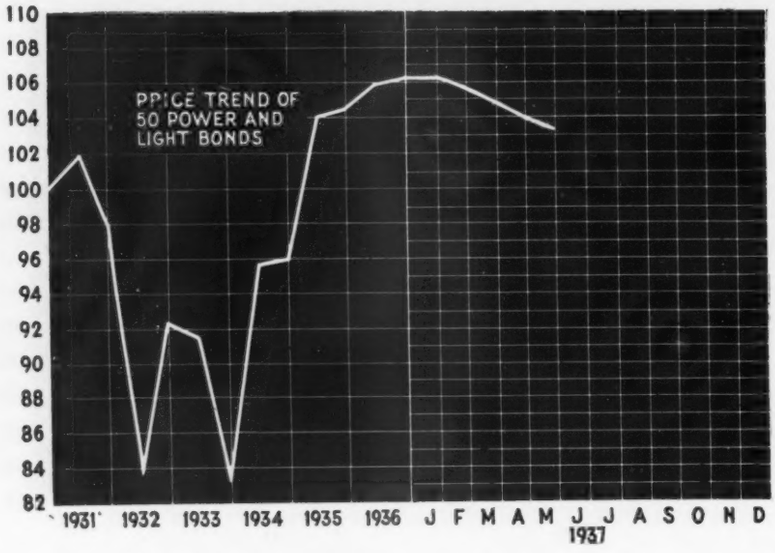
•

Nashville Power Vote Loses

Proposals that Nashville, Tenn., hold an election to determine whether the city should issue bonds to purchase present distribution facilities of the Tennessee Electric Power Company or construct its own system to use TVA power has been defeated 4 to 2, out of 99 votes in the House. All other members of the House voted "Present."

Utility Stocks and Bonds Off Slightly





"Electrical World" index of utility stocks, 32.5; previous week, 32.8; 1937 high, 41.5. "Electrical World" index of utility bonds, May, 103.4; April, 103.9; March, 104.7; February, 105.8; January, 106.2

Permits Note Issue in Illinois Merger

SEC has granted an application by the Union Electric Light & Power Company of Illinois to issue $14,750,000 of 2 per cent promissory notes and has permitted to become effective a declaration by the East St. Louis Light & Power Company covering an issue of $2,335,000 of promissory notes and the assumption by it of the notes issued by Union Electric Light & Power.

Applicant companies are subsidiaries of the North American Company and immediate subsidiaries of Union Electric Light & Power Company of Missouri, which owns all of their common stock. The proposed financing is for the purpose of consummating a merger under the laws of Illinois of the Union Electric Light & Power Company, East St. Louis Light & Power Company, Power Operating Company and Alton Light & Power Company into East St. Louis Light & Power Company, the name of which is to be changed to Union Electric Company of Illinois. The Federal Power Commission has approved the application for the merger.

•

Union Electric Proposes Huge Refunding Program

Union Electric Light & Power Company of Missouri is planning to issue approximately $110,000,000 of bonds and preferred stocks in a huge refunding program of practically all present senior securities, according to recent reports. The company recently withdrew from registration with SEC an issue of $22,000,000 of 3¾ per cent refunding bonds, due in 1967. The plan, it is understood, calls for issuance of $80,000,000 of bonds and $30,000,000 of preferred stocks. Registration of the issues with the SEC is expected in the near future.

•

Large Issues Filed by Niagara Utility

Registration statement has been filed with the SEC by the Buffalo Niagara Electric Corporation covering $17,029,000 of general and refunding mortgage 3½ per cent bonds, series C, due on June 1, 1967, and $7,000,000 of serial debentures, proceeds from which will be used in refinancing and in an expansion program. The debentures include $2,100,000, series A, 2 per cent, due on June 1, 1938 to 1942; $2,400,000, series B, 3 per cent, due on June 1, 1943 to 1947, and $2,500,000, series C, 3¼ per cent, due on June 1, 1948 to 1952.

Net proceeds will be used as follows:

$7,380,450 for the redemption on July 1 at 105 of $7,029,000 of Buffalo General Electric Company first refunding 5 per cent gold bonds due April 1, 1939; $10,300,000 for the redemption on August 1 at 103 of $10,000,000 of Buffalo General Electric Company general and refunding mortgage 5 per cent gold bonds, series A, due on February 1, 1956; $3,575,000 for discharge of "unfunded indebtedness" of the company, of which $2,460,000 is owing to Buffalo, Niagara & Eastern Power Corporation; $700,000 to Canadian Niagara Power Company, Ltd.; $265,000 to Hydraulic Race Company, and $150,000 to Niagara Junction Railway Company, all affiliated companies.

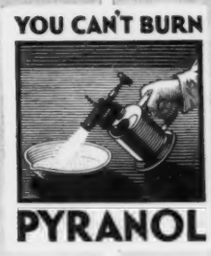
Utilities Earnings

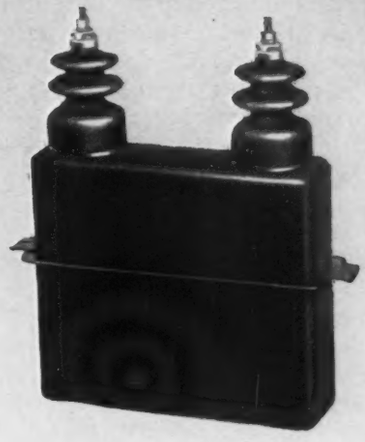
	Net Income 1936	1935
National Pwr. & Lt. and subs.	$7,094,578	$6,296,835
South Carolina Elec. & Gas (formerly Broad River Power)	272,699	178,989
	1937	1936
Metropolitan Edison	$2,539,545	$1,220,234†
Buffalo, Niag. and East. Pwr. Corp. and subs.	9,053,553	6,992,350†‡
New Jersey Pwr. & Lt.	1,032,491	538,796‡
Elec. Pwr. & Lt. and subs.	8,076,460	2,644,884*
United Gas Corp. and subs.	10,995,406	6,387,004*
Amer. Gas & Elec. and subs.	12,357,891	10,735,588†
Assoc. Gas & Elec. and subs.	3,466,922	349,545†
Amer. Pwr. & Lt. and subs.	10,228,376	8,166,425*
Nat. Pwr. & Light and subs.	7,409,916	6,222,816*

* Twelve months ended Feb. 28.
† Twelve months ended March 31.
‡ Restated for adjustment purposes.

WITH CAPACITORS

. . . AND USE PYRANOL CAPACITORS





CLASS DPT HOUSED POLE-TYPE EQUIPMENT		CLASS ID INDIVIDUAL POLE-TYPE UNIT
30 to 180 kva, 1, 2, or 3 phase, 2300, 4000, and 4600 volts. Available in steps of 30 kva, three-phase and two-phase. Available in steps of 15 kva, single-phase.	**Ratings**	10 and 15 kva, single-phase, 2300 and 4000 volts. 15 kva, single-phase, 4600, 6900, 11,950 gr-Y volts.
Crossarm suspension.	**Mounting**	Single unit—on crossarm, or through-bolted to pole. Units in multiple—180 kva and below, three-phase—on double crossarm. Can be installed at transformer, utilizing existing cutouts and arresters.
Ventilated welded steel housings—strong, compact, dust-tight bus compartment.	**Housings**	Weatherproof welded cases drawn from heavy-gauge steel.

And the units in these equipments are treated and filled with noninflammable, nonexplosive Pyranol—which has made the General Electric capacitor service record 99.83% perfect.

E L E C T R I C

Field OPERATING PRACTICES

New ideas and practices in the operation of well-designed, constructed and maintained plants and systems

Use Compact Kit for Meter Field Testing

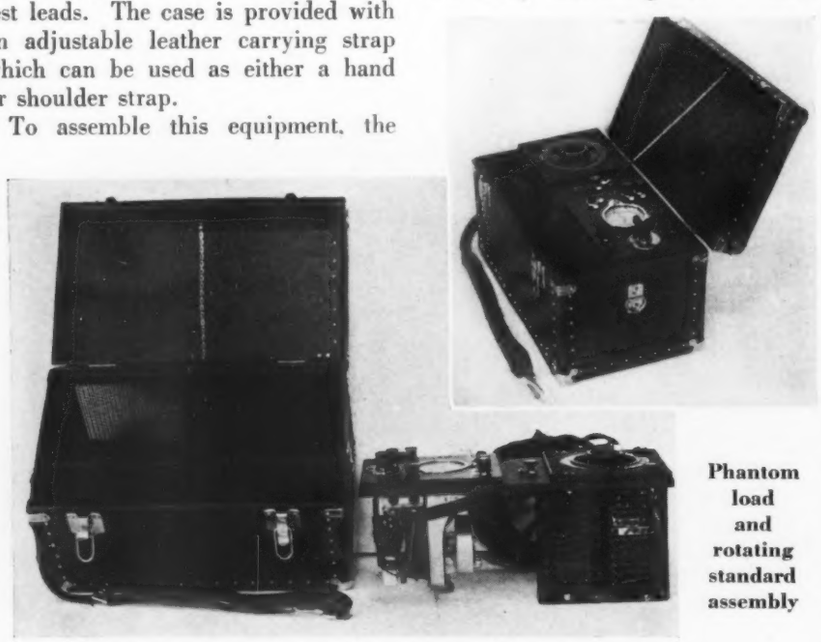
By J. S. WANTLAND
Foreman, Electrical Laboratory
Oklahoma Gas & Electric Company

In order to provide field watt-hour meter test equipment in a compact, neat unit, convenient to carry and to use, a new assembly has been developed in the electrical laboratory of the Oklahoma Gas & Electric Company. The kit is designed for phantom loads and rotating standards already in use.

The case is constructed of plywood and covered with fiber, making it light in weight as well as rugged and serviceable. It is approximately 10 in. wide, 9-½ in. deep and 17 in. long. Complete with rotating standard, phantom load and test leads, it weighs the same as the rotating standard and phantom load when in their original, individual cases with test leads. The case is provided with an adjustable leather carrying strap which can be used as either a hand or shoulder strap.

To assemble this equipment, the phantom load is removed from its original case and mounted by two simple brackets to one end of a panel that is the length of the inside of the case. The other end of the panel is cut so that the rotating standard will fit into it in the same manner that it fits into its original case. All connections are made on the bottom side of the panel. The leads for connecting to the meter under test are twisted together and brought out as a cable. The panel with the phantom load and rotating standard mounted thereon is slipped into the case, which has partitions in it for separating the load from the standard and providing a separate compartment for the test leads. Ventilation is also provided for the load. The panel and equipment are so arranged that fastening the panel to the case with screws is unnecessary.

Rotating standards of the same type are easily interchangeable in this assembly by removing the connections on the bottom side of the panel. Neither the standard nor load is defaced in any way by so mounting them; consequently, they may be returned to their original cases at any time.



Phantom load and rotating standard assembly

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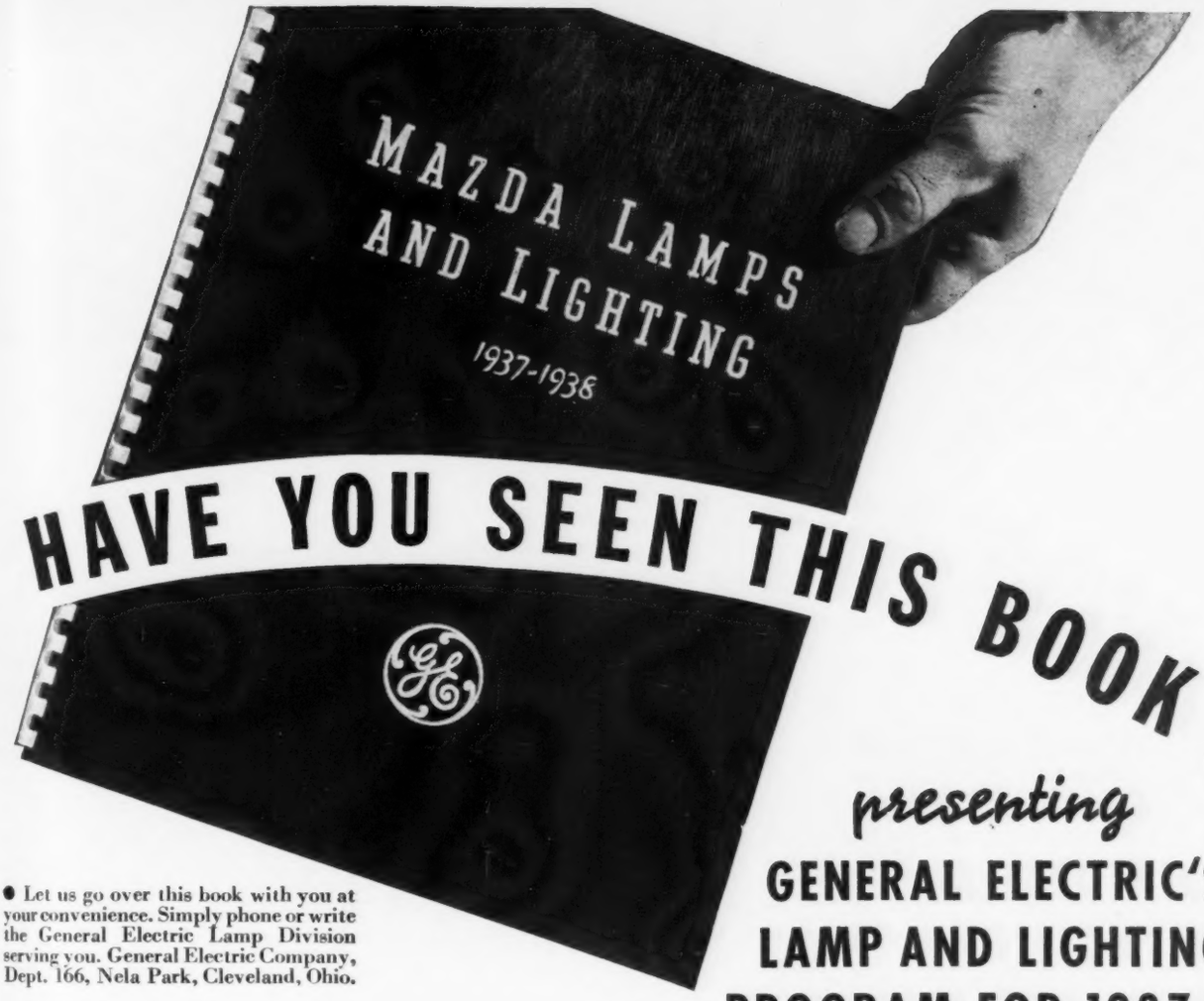
British Explore Earth Resistances

Incidental to a study of protective multiple earthing and application of earth-leakage circuit breakers, H. G. Taylor assembled some significant earth resistance data and presented them in a recent I.E.E. paper in London. Values measured by Megger in four villages, none of which have general water systems, ranged from 0.35 to more than 3,000 ohms. One-fourth were below 10 ohms, 35 per cent between 10 and 50 ohms and 40 per cent over 50 ohms. For the 240-volt prevailing system it was found that if the ground resistance exceeds 150/I (I being the normal carrying current of the fuse) the fuse will not blow within half an hour. Allowing 1 ohm for earth resistance at the substation, this leads to the conclusion that services at certain percentages of customers would not blow certain ratings of fuses within one-half hour (or one hour if the resistance is not over 120/I ohms) as shown in the following table:

Fuse Amps.	Per Cent of Installations ½ hour	1 hour
5	58	64
10	71	71
15	73.5	76
20	77	80.6
30	83	88

Of the installations using a rod or plate electrode none would blow a 10-amp. fuse in one minute and only 10 per cent would blow a 5-amp. fuse.

The article canvasses alternative



HAVE YOU SEEN THIS BOOK?

presenting

GENERAL ELECTRIC'S LAMP AND LIGHTING PROGRAM FOR 1937-38

● Let us go over this book with you at your convenience. Simply phone or write the General Electric Lamp Division serving you. General Electric Company, Dept. 166, Nela Park, Cleveland, Ohio.

Further evidence of how General Electric is promoting the Better Light-Better Sight program is this advertisement which appears in the June 5 SATURDAY EVENING POST.

General Electric's new book, "MAZDA Lamps and lighting" for 1937-38 is alive with valuable information and comprehensive plans for utilities. Every utility executive interested in building lighting load during the coming season will find this book very profitable. Highlights in this book include plans for:

1. Creating more 100% lighted homes . . . homes that produce 1000-1500 kwh. of lighting load per year . . . that will be "examples" for all local home lighting.

2. Gearing up for the sale of 100,000,000 I.E.S. Better Sight Lamps . . . the saturation of the market is only 3.4%.

3. Filling empty sockets—General Electric has prepared complete plans for effective campaigns . . . profitable to both the utility and the dealer alike.

In addition, the book contains charts showing load building prospects for homes, stores, offices, industries, schools, streets and highways and specific information on the opportunities ahead. Also complete data on how General Electric will promote and advertise lamps and lighting. PLUS a list and description of full supporting material that will be available.

THEY STAY BRIGHTER LONGER

GENERAL ELECTRIC

methods of providing protection and concludes that earth-leakage circuit breakers while not in all cases functioning at a voltage below the danger limit (30 volts) have contributed materially toward reducing the risks of electric shock.

•

Network Regulation by Undercompensation

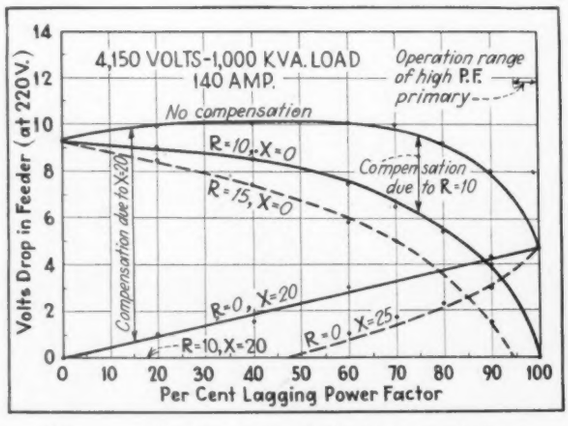
By BERTRAM E. ELLSWORTH
Engineer Iowa-Nebraska Light & Power Company, Lincoln, Neb.

Two d.c. generators will work together and divide load if their voltage curves have a drooping characteristic; that is, voltage decreases as load is placed on the machines. In the same way the primary feeders supplying a secondary network must be so regulated at the plant or substation so that the voltage at full load will be slightly less than at no load. The induction voltage regulators must be undercompensated to accomplish this result.

With complete compensation one feeder is liable to go to maximum boost position and the other to maximum buck, resulting in high circulating currents and unstable voltage conditions. This action may be prevented by interconnecting the regulators by control circuits or mechanically, both of which are highly undesirable.

The method of undercompensation is illustrated by the accompanying curves. The curve marked "No compensation" shows the regulation of a given feeder at full load with varying power factor. In order to compensate completely for this feeder the resistance and reactance settings on the compensator must be $R = 10$ and $X = 20$.

Two curves, marked $R = 10$, $X = 0$ and $R = 0$, $X = 20$, illustrate what part each type of compensation plays in the regulation of this feeder. If the resistance value is set at 15 instead of 10, then a rising voltage characteristic is given to this feeder at power factors higher than 94 per cent (shown by broken curve). Also, if a reactance value is set at 25 instead of 20, then a rising characteristic exists for power factors less than 48 per cent (also shown by broken curve). Observe that the graph shows voltage drop, not line voltage, and a rise in the latter appears as a decline on the graph.



Compensation in network feeder regulation

It so happens in a network that circulating currents will flow between the feeders at all times. Because of this current one feeder assumes a higher power factor than the others. This power factor is usually between 95 and 100 per cent. This particular feeder sets the voltage for the network and compensators need be set only for this range. The proper setting for the feeder given in the example is resistance 5 and reactance 0. With this setting the voltage will drop 2¼ per cent at 100 per cent power factor and 4.8 per cent at 95 per cent power factor at full load, which is the operating range of the feeder assuming the highest power factor.

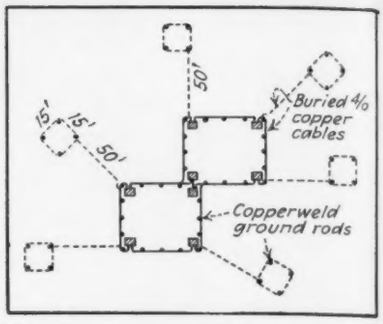
Regulators are set at plus or minus one volt, which limits circulating currents. Very constant network voltage is secured by this method.

•

Extend Ground System to Reduce Resistance

By B. VAN NESS, Jr.
Pennsylvania Water & Power Company, Baltimore, Md.

Resistance of the original grounding system installed at the Lehman Farm switching structure of the Pennsylvania Water & Power Company was reduced from 18 ohms to 8 ohms by installing a system of 24 12-ft. ground rods arranged in groups of four as shown in the accompanying diagram and connecting them to the original ground system by buried cables. Originally thirty ground rods had been installed in two rectangles surrounding the footings for the steel framework of the switching structure and interconnected by a No. 4/0 copper conductor buried 1 ft. in the earth.



Supplementary ground system reduces resistance 44 per cent

•

Polyphase Rectifier Metering Accurate

Investigating the accuracy of input metering for mercury-arc rectifiers, C. Dannatt reports to the I.E.E. at a recent London meeting that the error of a modern well-designed induction watt-hour meter is not likely to exceed 1 per cent in the case of a three-phase rectifier connection or ½ per cent with a six-phase connection. This applies to (1) a meter correct with sinusoidal voltage and current, (2) sinusoidal voltage and distorted current, (3) to any case of distorted voltage *and* current likely to arise in rectifier practice.

Thomson (commutator) meters are sufficiently independent of frequency to render them accurate for rectifier power input measurements, provided no shunt is employed to feed the field coils. If a non-inductive shunt is used a considerably enhanced frequency-error is introduced due to the altered time-constants of the circuit. If, however, the shunt is given the same time-constant as the field coil, the commutator meter can be as accurate on rectifier circuits as it is on normal ac. power metering.

On the dc. side reduction of the ripple is conducive, of course, to better accuracy of the output metering. For a 92 per cent ripple at one-fourth load in a three-phase rectifier the mercury type meter showed 6.1 per cent slow; at full load with a 66 per cent ripple the meter was 2.5 per cent slow due largely to the frequency effect associated with the potential coil inductance. The same meter on a six-phase rectifier with 16 per cent ripple was only ½ per cent slow.

"Here's Where I Get My Speed—Dual Continuous Control of the "SAE" gives me the right *type* of arc and the *exact welding current* for smoothest possible performance on every job. I spatter less and weld better.

"Here's Where I Get My Endurance—The "SAE" welder is self-protected against burnout so you can use me in my bigger sizes and get top speed *continuously.*

"That's how I'm *sprinting the marathon* these days—giving *'Shield-Arc SAE'* users 15% to 20% faster welding than they can get with 1937 model welders of conventional design.

"Yours for lower welding costs,
"FLEETWELD ROD"

—Spokesman for all progress-minded welding electrodes and emissary of

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Largest Manufacturers of Arc Welding Equipment in the World

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THE WELDER WITH DUAL *CONTINUOUS* CONTROL

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☐ My welding application is_____
How can the "SAE" do it faster?
☐ Send a free copy of Bul. 412 giving details about the new *"Shield-Arc SAE"* welder.

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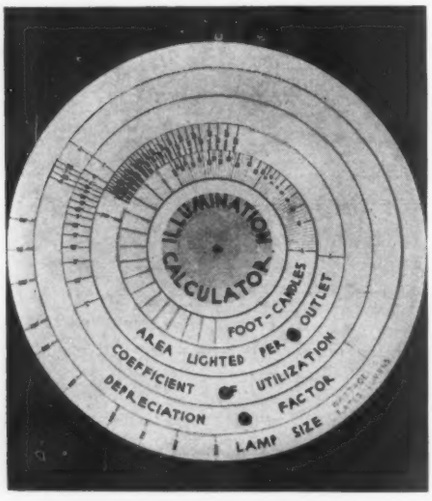
New ENGINEERING IDEAS

Discoveries, proposals and developments by electrical engineers and scientists in the field, the factory and the laboratory

Slide Rule Speeds Lighting Calculations

Ready solution of lighting problems is made possible by a circular lighting slide rule designed by R. G. Raymond, managing director of the Chicago Lighting Institute. The device



Circular slide rule for solving lighting problems

has been found particularly adaptable to classroom work since it keeps the factors involved in the solution of any lighting problem constantly before the students.

To use the slide rule the required foot-candle intensity is selected. The index line of the disk labeled "Area Lighted per Outlet" is set opposite the selected value of intensity. Fixture spacing or area lighted by each fixture is next determined and the index line of the "Coefficient of Utilization" disk is lined up with the designated area or spacing.

The coefficient of utilization is found in a suitable auxiliary table and the "Depreciation Factor" disk moved until the No. 1 line points to this numerical utilization. Finally, the outer disk is shifted opposite the proper depreciation factor, whereupon the proper lamp size will be indicated. By reversing the entire procedure it is simple to determine the number of foot-candles produced by a given lamp size on given spacing.

•

Zipper Sacks Keep Prints Undamaged

Frequently consulted blueprints on file in the drafting room or in the field office get pretty ragged and dirty within a short time unless they are given some kind of protection. Any one who wants to keep file prints clean and in good shape can do no better than to copy an idea which is in use in the drafting room of a midwestern utility. Zipper sacks similar to the currently popular zipper portfolios form the basis for this blueprint filing scheme.

These blueprint holders are made from a fold of heavy canvas with the prints lying flat between the canvas surfaces above and below and held in the fold by clamping strips. The zipper goes all the way around the three open edges of the canvas fold, making it, when the zipper is closed, a heavy dust-tight bag. By means of a hook attached to the center of the clamp the holder is hung on a pipe rack, lined up with its fellows. Identifying designations are lettered on the outsides of the holders so that prints may easily be found.

Steel Tubing Allows Tower Extension

Advantages of the use of steel tubing in tower structures were illustrated recently when it was found that use of structural steel members in a 100-ft. extension to radio station WHK's towers would exceed the safe weight and wind loading of the supporting structure. Application of high-strength, light-weight, rail-carbon tubing (made by Steel & Tubes Inc.) to the tower extension, however, reduced the weight and wind loads below the strength limitations of the structural supporting towers. The extension thus made possible increased the height of the towers from 200 to 300 ft. and permitted the use of 30-ft. circular radiators. With these radiators on each tower stations WHK and WJAY (Cleveland) were able to broadcast separate programs simultaneously from the set of towers formerly used to support the antenna of WHK alone.

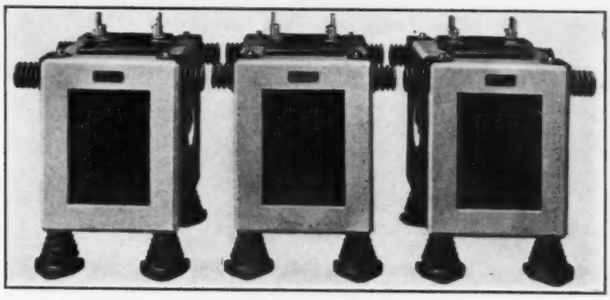
The tubing selected has a yield point of 65,000 to 75,000 lb. per sq. in., with an elongation of 15 per cent in 2 in. Vertical members were fabricated of $2\frac{3}{8}$-in. tubing with a wall thickness of 0.217 and 0.154 in. flattened and drilled at the ends. Lacing was made of $1\frac{5}{16}$-in. diameter tubing with a wall thickness of 0.105 in. The entire structure was fastened with machine bolts. Vertical members have bolted sleeve connections.

Use of tubing for towers, while used to a lesser extent in this country, is not new. It has been used for a number of years in Europe for radio towers, transmision line towers and a number of other applications.

IN COLUMBUS

AS IN MANY OTHER METROPOLITAN AREAS

MURRAY LOW LOSS REACTORS



PROTECT DISTRIBUTION SYSTEMS

Designed for all kinds of services—indoor or outdoor—for line voltages up to 33 K.V., for currents up to 5000 amperes. Murray Current Limiting Dry Type Reactors consist of concentric stranded, enameled and asbestos insulated conductors mounted in a concrete housing.

Efficiencies are guaranteed and the ability of Murray Reactors to withstand severe short circuit conditions is a matter of record. Practically every large system in the country is protected by them.

Murray Feeder Reactors illustrated are rated, 67 K.V.A., 13.2 K.V., 60 cycles and are for installation in superimposed individual compartments.

For positive protection against short circuits, install Murray Current Limiting Reactors.

METROPOLITAN DEVICE CORP.
1250 ATLANTIC AVE. BROOKLYN, N. Y.

Industrial ELECTRIFICATION

New ideas and practices in industrial electrification as presented by industrial, consulting and power sales engineers

Spinning Control Boosts Production

By F. D. SNYDER
Westinghouse Electric & Manufacturing Company, Boston, Mass.

Variable factors of fiber length, quality of the yarn and humidity conditions influence the design of any drive system that is to maintain maximum economical spinning speed, and such a system has been developed. Use on wool and worsted spinning frames as demonstrated by several hundred recent installations shows that increases in production as high as 15 per cent are possible.

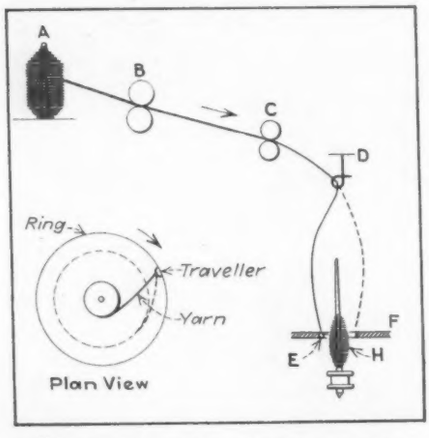


Fig. 1—Steps in spinning process

Spinning operations start with roving, which is the name given to a continuous strand or sliver of material with little or no twist and very little strength. Larger in diameter than finished yarn, roving must be reduced in diameter before spinning begins. This is done by running it through successive pairs of rolls each pair of which turns faster than those preceding. From the last pair of rolls the roving passes through a guide-eye to a "traveler" (Fig. 1) and is spun into yarn under tension created as the traveler is dragged around a "ring rail" by rotation of the spindle. Roving leaves package A, passes through successively higher speed rolls B and C thus reducing its diameter. Proceeding through eye D roving passes through traveler E, which is dragged around ring rail F by rotation of spindle H. As traveler passes around rail roving is twisted into yarn and wound on spindle H.

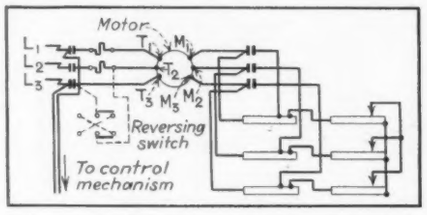


Fig. 2—Schematic diagram for "adjustable-speed" spinning control

Diagram for full variable control is similar, but resistance is not in face plate form.

Two major variables depending on the character of the material affect the spinning speed: (a) Drawing speed or speed at which the roving passes through the reducing rolls; (b) tension during spinning required to drag the traveler around the ring.

With long staple yarns, such as worsted, tension in the yarn is the factor limiting spinning speed. It becomes desirable, therefore, to vary the spinning speed to keep tension constant as the yarn is wound on different diameters of the bobbin. To meet this condition a "full variable-speed drive" has been developed using a wound-rotor motor. Connected to this motor is a heavy-duty type rheostat which has a direct-current motor commutator mounted on the same shaft with a number of tube resistors connected to the commutator segments. Brushes ride on the commutator and by rotating the commutator the resistance is varied from zero to full value. Since the rheostat is mechanically connected to the builder motion of the spinning frame, speed is automatically changed as the yarn is wound on large and small diameter bobbins.

In spinning short staple woolen yarns the limiting factor affecting speed is drawing. The amount of drawing necessary and the rate of drawing possible varies from day to day, depending on the quality of the yarn and the humidity. A variation in spinning speed of about 25 per cent is all that is necessary to care for the difference in drawing requirements. By again using a wound-rotor motor with a suitable face plate rheostat speed can be varied manually from 75 per cent to full speed. The operator does not disturb the speed setting while starting. A separate starting resistor is used with a timing relay to give proper starting. This form of variable speed spinning is known as "adjustable speed" spinning.

•

Electronic Regulators Stop Light Flicker

In order to obtain voltage regulation close enough to prevent a constant variation of brilliancy in the store lighting, the A. I. Namm Department Store, Brooklyn, N. Y., has installed five electronic voltage regulators.

Each regulator controlls one of five generators. All of the generators, four of which are 200 kw. and one of which is 100 kw., may be operated in parallel on the plant buses.

These Ward Leonard regulators rectify current from the alternating-current bus and supply direct current to the field of the exciter in an amount sufficient to maintain the voltage constant. Relays automatically provide self-excitation of the fields during starting and in the case of tube failure.

Little or no change of factory adjustment was necessary when the regulators were installed. They provide very rapid recovery on heavy load changes and no flicker of the lights under fluctuating load conditions has been experienced throughout the

VARNISHED CAMBRIC • RUBBER POWER CABLES • BUILDING WIRE • RADIO WIRES • SIGNAL CABLE • FLEXIBLE CORDS • LEAD-ENCASED AND PARKWAY CABLES • ARMORED CABLE

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The Department of the Interior Building
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Elec. Contr.; H. P. Foley Co., Washington, D. C.
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This Magnificent Building Wired Throughout with

CRESCENT ENDURITE WIRE *and* CABLE

CRESCENT ENDURITE Rubber Compound is a super-aging, heat-resistant insulating material which exceeds Federal Specifications JC-106, required by the Government for installation in permanent Federal buildings.

Due to its superior heat resisting and high dielectric characteristics, it is especially suited for use when electrical conductors are required to meet abnormal temperature and aging conditions.

CRESCENT
INSULATED WIRE & CABLE CO. INC.
TRENTON, NEW JERSEY

CRESCENT ENDURITE SUPER-AGING INSULATION • WEATHER-PROOF WIRE

period that the plant has been in operation.

The regulators were made by Ward Leonard Electric Company; the installation was engineered by Huxley Madeheim and Henry Rosenthal.

•

Arc-Welded Pipe Joints Show Strength

By D. O. FERGUSON
Welding Engineer
Ohio Fuel Gas Company, Columbus

Electric arc welding, properly done, will develop the full strength of the welded material. Removing test coupons with a torch-cutting machine does not affect their characteristics, and taking out the chill rings or inner liners from properly made pipe welds will not affect their strength. These conclusions are derived from tests recently made in the shops of our company on three specimen welds made in 20-in. pipe. Before the coupons were cut the specimens were subjected to hydrostatic pressures: No. 1, 1,720 lb. per sq.in.; No. 2, 1,820 lb. per sq.in.; No. 3, 1,770 lb. per sq.in.

Tensile Strength Tests *

Specimen No.	Coupons No.'s (incl.)	Unit Pull—Lbs./Sq.In. Maximum	Minimum	Average
1	4- 7	69,700	67,350	68,475
2	18-21	72,600	70,700	71,825
2	25-28	73,400	72,300	72,925
2	32-35	70,850	70,250	70,650
3	11-14	71,450	68,700	70,425
All tests		73,400	67,550	70,855

* With three exceptions all breaks occurred 1½ in. from the weld. In the cases of coupons 25 and 32 the breaks were 2 in. from the weld and in coupon 19 the break was ½ in. away.

All the welds were straight girth-line rotated-type on single V-butt joints, each side beveled 30 deg. with 1/32-in. shoulder. Chill rings were used in each case. Welds were made by the Fleetweld process of shielded arc welding. Actual welding times, excluding lining up, tacking, cleaning, etc., were 14½ minutes for the first weld and 14 minutes each for the second and third.

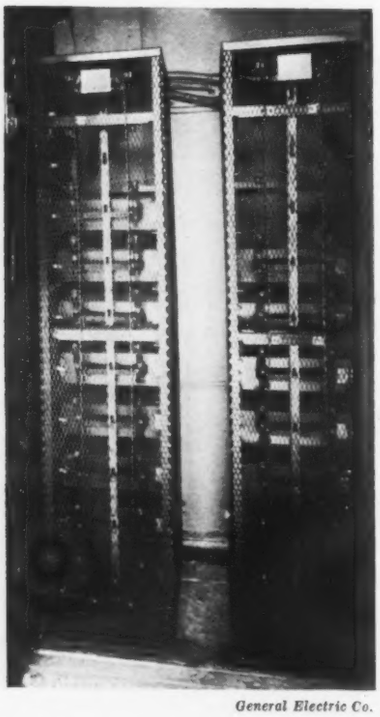
Seven coupons or small strips of metal running lengthwise of the pipe, at right angles to the weld and containing a portion of it, were selected for the regular tests for mechanical strength of the completed joint. From specimen No. 2 three sets of seven coupons each were taken in order to make comparison between machine torch cut coupons and machine tool prepared coupons and also to find out whether the removal of the chill ring from the joint (considered necessary if coupons are torch cut) affected the quality of the joint. Coupons Nos. 15 to 21 were removed by the torch coupon cutting machine with the chill ring removed. Coupons Nos. 22 to 28 were removed by a machine tool with the chill ring removed. Coupons Nos. 29 to 35 were removed by a machine tool with the chill ring in place. The tests show that all of the specimens welded by the shielded arc process exceeded our tensile, ductility, reverse bend and nick-break requirements for a satisfactorily welded joint by a considerable amount.

Five coupons were subjected to nick-break tests. They were No. 1 from specimen No. 1, Nos. 15, 22 and 29 from specimen No. 2 and No. 8 from specimen No. 3. In all cases good weld metal exhibiting complete penetration and fusion was exposed.

In the 90-deg. reverse bend tests only one coupon broke, No. 16 from specimen No. 2. The others, No. 2 from specimen No. 1 and Nos. 23 and 30 from specimen No. 2, and No. 9 from specimen No. 3, showed no fracture.

Elongations in ½ in. of weld metal were 0.313 in. for coupon No. 3, specimen No. 1, 0.219 in. for coupon No. 17, specimen No. 2, and 0.344 in. each for the remaining three, coupons Nos. 25 and 31 from specimen No. 2 and coupon No. 10, specimen No. 10.

CAPACITORS SAVE 54% OF COST ANNUALLY



General Electric Co.

These Pyranol capacitors, installed in the plant of the Louie Glass Company, Weston, W. Va., are paying for themselves in less than two years. The capacitors, costing $1,545, made possible a saving of $560 in eight months of operation—an annual saving of $840—as a result of improvement in plant power factor. At this rate the cost of the capacitors will be saved in 22 months, after which the savings become profit.

•

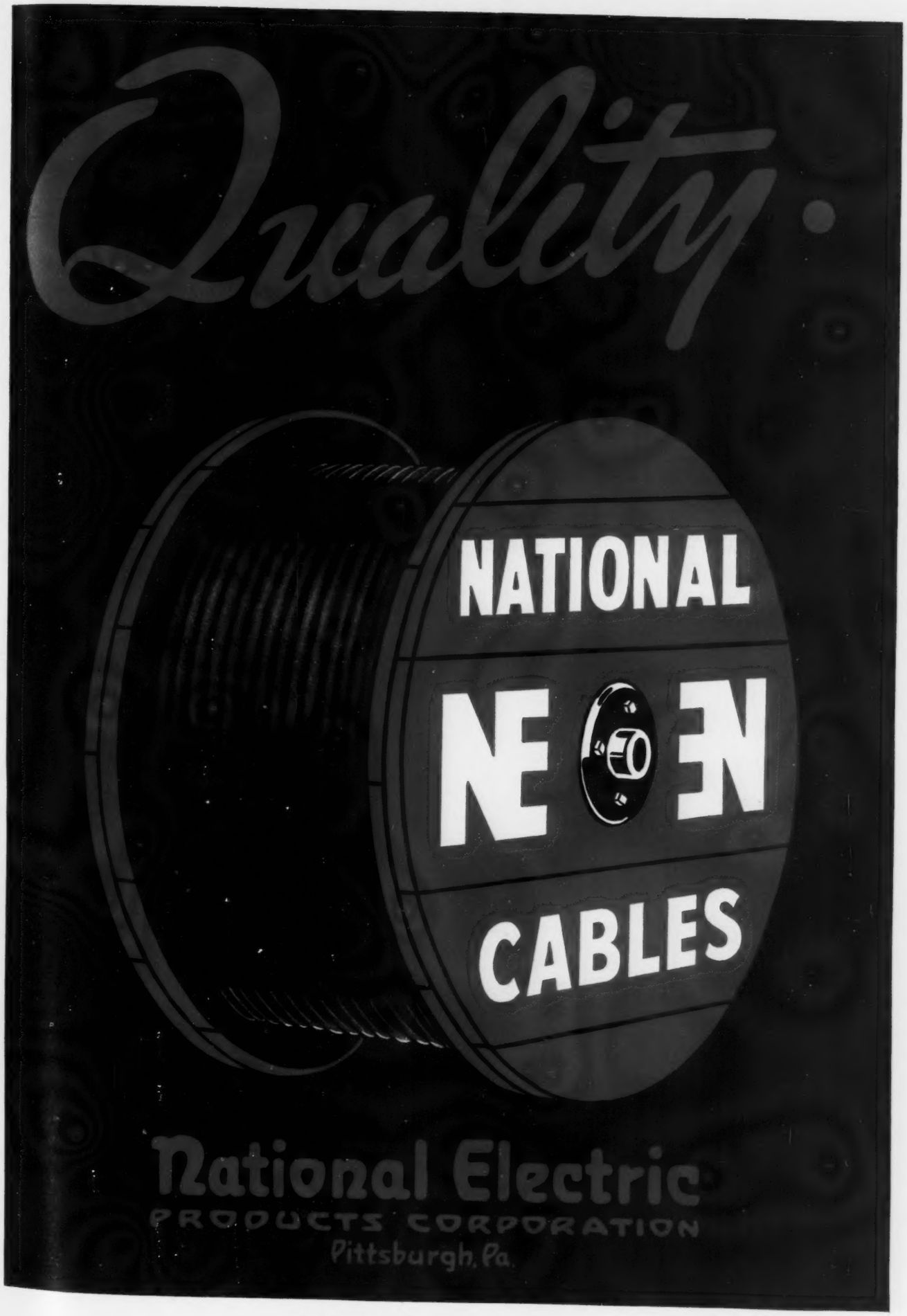
Motorized Sorter Separates Walnuts

By ALLEN P. CHILD
Kansas City, Mo.

A sorter capable of separating hulled from unhulled English walnuts at the rate of 40 bushels per hour has been designed and built by Walter E. Sutton of the Los Angeles Fruit and Vegetable Laboratory of the federal Department of Agriculture at an approximate cost of $25, without the motor.

The device is operated by a ¼-hp., 1,450-r.p.m. motor, which drives the jiggling grid of the device through a 1-in. belt, 24 in. between centers. Several ½-in. pipes make up the sloping grid, which is agitated by cams attached to a shaft that turns at 480 r.p.m. Width between the pipes allows the hulled nuts to drop through, while the unhulled nuts are carried along the full length of the grid. The working space above the grid is 40 in. long, 20 in. wide and 6 in. deep.

Motor-operated walnut sorter handles 40 bu. per hour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NATIONAL
NEON
CABLES
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PRODUCTS CORPORATION
Pittsburgh, Pa.

News ABOUT PEOPLE

New Vice-Presidents Named by Consolidated Edison

Three new vice-presidents elected by the Consolidated Edison Company of New York last week have long service records in the public utility industry.

A. Augustus Low entered that field in 1928 when he organized and became president of the Old Forge Electric Co.poration at Old Forge, N. Y. In 1931 he was elected executive vice-president and director of the Utica Gas & Electric Company, assuming the duties of president three years later.

A. A. Low

In 1936 he became identified with the Consolidated system as executive vice-president of the Brooklyn Edison Company.

Harry R. Woodrow entered upon his public utility career in 1911 as assistant to the chief electrical engineer of the New York Edison Company, later being made assistant chief electrical engineer. He subsequently joined Stone & Webster, and later the Westinghouse Electric & Manufacturing Company, before entering the service of the Brooklyn Edison Company as assistant electrical engineer in 1922. Four years later he was promoted to electrical engineer and since 1932 he has been vice-president, the office from which he resigned last week.

H. R. Woodrow

David C. Johnson's first association with the utility industry was with the Astoria Light, Heat & Power Company in 1906. After a connection with Humphrey & Miller, consulting engineers, in the appraisal of public utility properties, he joined the National City Company as manager of its public utilities department. In 1927 he was elected vice-president of the New York Steam Corporation and the following year president.

D. C. Johnson

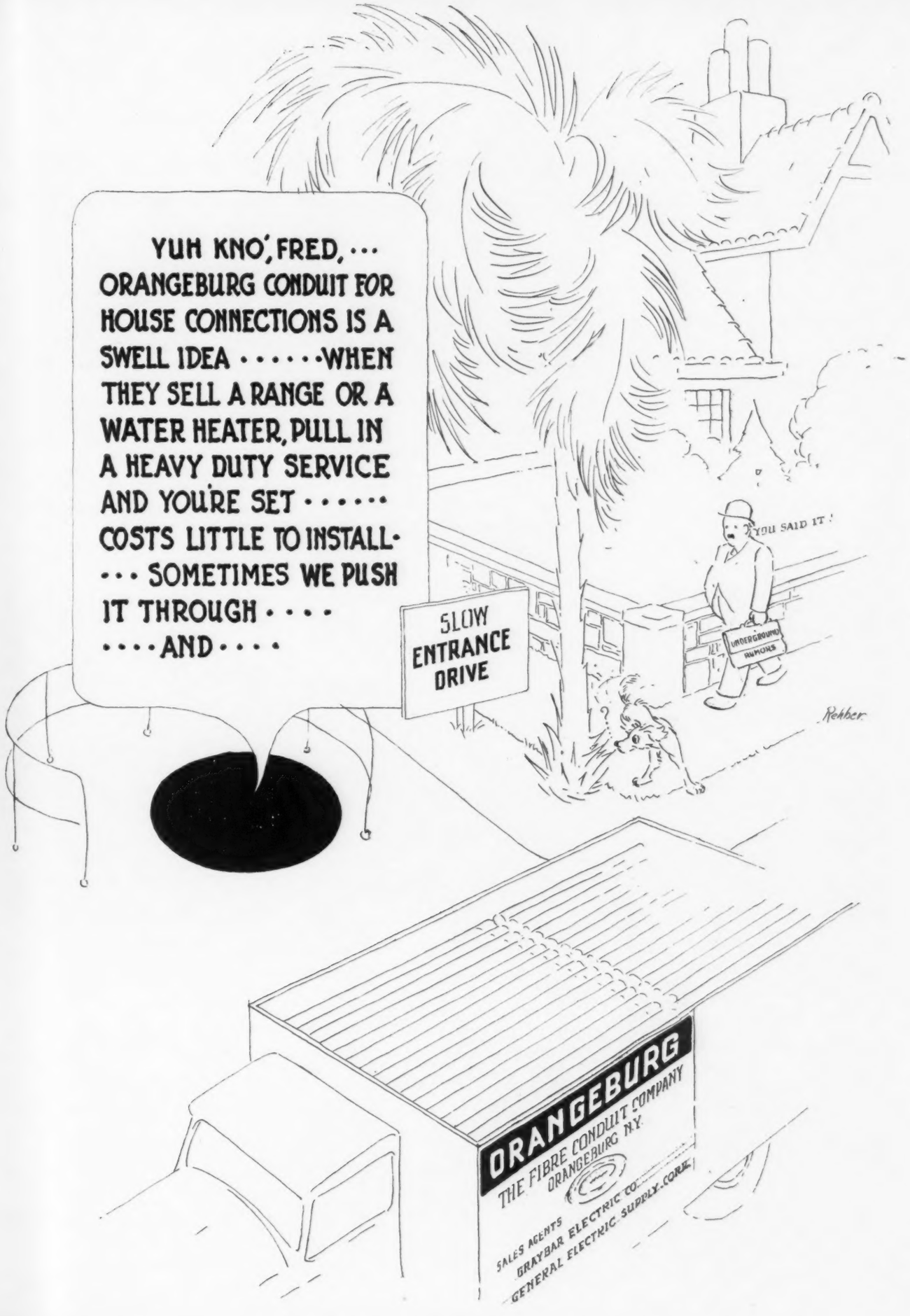
R. M. Alvord Named President of Pacific Coast Group

R. M. Alvord, manager of General Electric Company's Pacific district, was elected president of the Pacific Coast Electrical Association at the recent annual meeting. The election of Mr. Alvord, the first non-utility man to head the association since its organization twenty years ago, is indicative of the determination to make the association an all-industry organization.

Following graduation from Iowa State College in 1904 Mr. Alvord entered the G.E. test course in Schenectady. He was transferred to San Francisco in 1906 as a salesman. Since that time he has been consecutively manager of the supply department, manager of the San Francisco district office, and since last year manager of a newly created district consisting of California, Arizona and western Nevada.

R. M. Alvord

For many years he was a director of the Pacific Coast Electrical Bureau as well as vice-chairman of that body and chairman of its lighting committee. For the past three years he has been a director of the Pacific Coast Electrical


YUH KNO', FRED, ···
ORANGEBURG CONDUIT FOR HOUSE CONNECTIONS IS A SWELL IDEA ·····WHEN THEY SELL A RANGE OR A WATER HEATER, PULL IN A HEAVY DUTY SERVICE AND YOU'RE SET ·····
COSTS LITTLE TO INSTALL·
··· SOMETIMES WE PUSH IT THROUGH ····
····AND····
SLOW ENTRANCE DRIVE
YOU SAID IT !
UNDERGROUND RUMORS
Rehber
ORANGEBURG
THE FIBRE CONDUIT COMPANY
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GENERAL ELECTRIC SUPPLY CORP.

Association. He was one of the organizers of the San Francisco Electrical Development League and served as its president in 1917. Mr. Alvord also has many interests outside the electrical industry.

•

▶ CHARLES W. E. CLARKE has rejoined the staff of United Engineers & Constructors, Inc., as consulting engineer with headquarters in Philadelphia.

▶V. L. BOARD, vice-president of the Public Service Company of Colorado, has been elected a member of the board of directors of the Denver Chamber of Commerce for a three-year term.

▶ R. D. SUTHERLAND, Canadian Westinghouse Company, Ltd., Montreal, has been elected president of the Electrical Club of Montreal for 1937-38.

▶ FRANK J. GANNON, vice-president and general manager of the Tampa Electric Company, has been elected president of the Tampa Chamber of Commerce.

▶ EMMETT G. RALSTON, executive vice-president of the Indianapolis Power & Light Company, has been elected president of the Electric League of Indianapolis.

▶ C. W. STUART has been appointed assistant manager of the General Electric Home Bureau, New York. Mr. Stuart will also continue his duties as secretary of the appliance sales committee.

J. A. Harlan

manager of the commercial division of the Nash-Kelvinator Corporation, was elected president of the Air Conditioning Manufacturers' Association at the recent convention in Hot Springs, Va.

Mitsui Interests Present Testimonial to W. H. Carrier

Commemorating his twenty-fifth anniversary as the father of modern air conditioning, Willis H. Carrier, chairman of the Board of Carrier Corporation, Newark, N. J., received a valuable gift chest from Mitsui & Company, Japanese business leaders, at a testimonial luncheon held recently in the Empire State Club of the Empire State Building.

Presentation of the lacquered chest was made by Hatsujiro Yoshida, general manager of Mitsui & Company, in behalf of Tokyo Carrier, affiliated Carrier company in Japan, in honor of Mr. Carrier's disclosure, 25 years ago, of the Rational Pschrometric Formulae before the American Society of Mechanical Engineers. Mr. Yoshida pointed out that the gift was also in recognition of Mr. Carrier's contributions to the air-conditioning science in Japan, where he made the first installation in that country.

Other Japanese recognition of Mr. Carrier's silver jubilee included an honorary membership in the Japanese Association of Refrigeration Engineers and an award from Dr. Masao Kamo, president of the association.

▶ H. C. WEBB, formerly assistant sales manager of the Virginia Electric & Power Company, has been appointed assistant to Patrick Johnson, new general sales manager of the Puget Sound Power & Light Company, Seattle. Mr. Webb will have special charge of rates and rural extension development.

▶ M. C. BARR, manager of the Public Service Company of Indiana at Princeton for the past four years, has been transferred to the company's office at Lebanon in the same capacity. J. C. JARVIS of Bloomfield will succeed Mr. Barr in Princeton.

▶ LEONARD PEEL has assumed management of the contracting department of the E. J. Peel Electric Company, Ltd., operating in the Kerrisdale suburban business area of Vancouver. Mr. Peel is the eldest son of E. J. Peel, pioneer Vancouver electrical contractor and dealer.

▶ C. T. BAKEMAN, formerly in charge of commercial and home lighting for the Puget Sound Power & Light Company, Seattle, has been appointed to direct the new commercial and industrial section formed from the consolidation of the commercial lighting section and the power sales section.

▶ W. J. DONALD, managing director of the National Electrical Manufacturers Association, was elected president of the Trade Association Executives in New York at the recent annual meeting at the Hotel Astor. Mr. Donald had been vice-president of the organization.

▶ LEON B. EICHENGREEN was elected a vice-president of the Philadelphia Electric Company at a recent meeting of the board of directors. He will be in charge of activities in connection with the gas properties of the company. Mr. Eichengreen became identified with the Philadelphia utility in 1928.

▶ CHAMBERS A. PATTERSON has been appointed sales engineer of the Holophane Company, Inc., for the St. Louis-Kansas City territory. Mr. Pat-

terson brings to the territory a thorough knowledge of illuminating engineering obtained through many years of experience in engineering capacities with power companies. His most recent connection was with the Alabama Power Company as commercial and industrial lighting engineer. It was from this position that Mr. Patterson resigned to take over his new duties with the Holophane organization.

▸FRED E. LITTLEFIELD, manager of the power sales department, Worcester (Mass.) Electric Light Company, has been appointed district power sales engineer at Worcester for the New England Power Service Company, succeeding Walter A. Sutphen.

▸W. S. GORDON, JR., has resigned as superintendent of electrical construction at the Philadelphia Navy Yard to become supervising engineer with Vare Brothers, Philadelphia, in connection with that firm's portion of the Harrisburg electrification of the Pennsylvania Railroad. Mr. Gordon is a member of the A.I.E.E.

▸FRANK J. GLOSSA of the electrical engineering department of the Boston Edison Company was among the new attorneys-at-law sworn in recently before the Supreme Judicial Court of Massachusetts. Mr. Glossa has been connected with the company for the past 25 years and will continue his engineering duties.

▸CLYDE E. ALLEN, an important factor in the organization of the Electric Kitchen Appliance Company, San Francisco independent distributor for northern California and Nevada of Hotpoint appliances, has become general manager of the new company. Mr. Allen has been for the past seventeen years with the Edison General Electric Appliance Company.

▸W. T. CHRISTY has been appointed chairman of the management committee and manager of the range and water heater section of the appliance and merchandise department of the General Electric Company. J. R. POTEAT will continue as sales manager of the section. Mr. Christy was formerly Southeastern district sales manager and Southern division supervisor of the Edison General Electric Appliance Company with headquarters in Atlanta, Ga.

Non-Breakable Metal Mercury Tubes

Made of specially processed pure metal—Jefferson Mercury Tubes provide an advanced design—a ruggedness never before available. The uniform cylindrical shape makes special orientation unnecessary. Being non-breakable they can be shipped in switch motions with ordinary packing precautions.

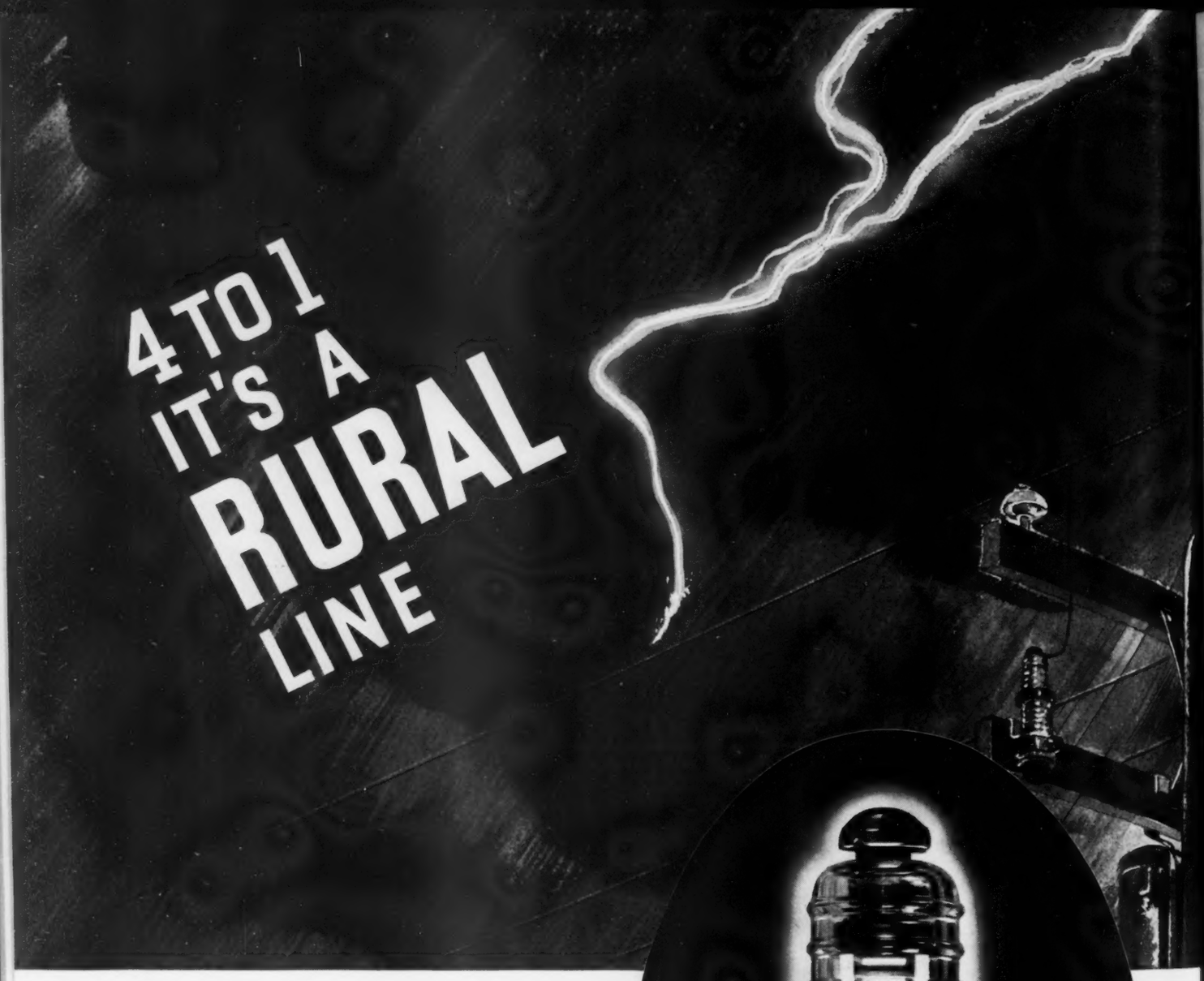
Furnished in capacities up to 15 amperes at 125 volts A.C., with the barrel grounded or sheathed in molded bakelite. The tubes are provided with extremely flexible insulated leads.

Thousands of field installations have proved their reliability and economy. Let us send you bulletin 371-MT—or outline your mercury tube requirements. JEFFERSON ELECTRIC COMPANY, Bellwood (Suburb of Chicago), Illinois. Canadian Factory: 535 College St., Toronto.

JEFFERSON METAL MERCURY TUBES

Here's a Novel Switch

Thirty-seven of the switches shown to the left were installed in one bank for the remote control of motors in a mine. Jefferson Metal Mercury Tubes make and break the relay circuits by movement of the finger lever. The metal tubes prevent accidental breakage, and the possibility of an open arc.



● Records show that heavy lightning surges hit rural lines *four times* as frequently as urban lines.

You can give your rural line transformers no better safeguard against lightning damage than the L-M Type "C" Lightning Arrester.

The high voltage line Type "C" is as fast as lightning itself in dissipating a surge. It has the extra capacity to stand repeated discharges without harm. Double-sealed against moisture, it provides effective protection for extra years. The distinctive transparent PYREX housing permits quick, accurate inspection on the line, with no delay.

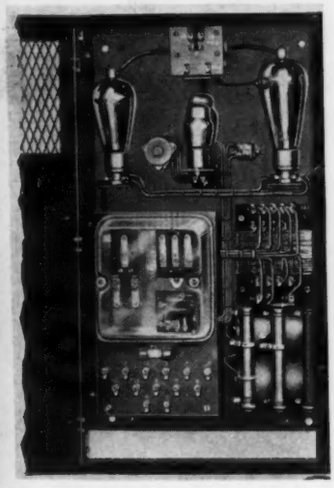
Ask to see the L-M Type "C", when your L-M representative calls, or write to South Milwaukee, Wisconsin, for lightning arrester information.

LINE MATERIAL CO.

New EQUIPMENT AVAILABLE

Voltage Regulators

Two automatic electronic alternator voltage regulators are announced; they are controlled rectifiers deriving their power from the a.c. generator and delivering rectified d.c. current to the shunt field of the exciter in an amount that is a function of the a.c. generator potential. The illustrated model may be used with any known method of excitation, says the manufacturer and has been redesigned with an isolated supply transformer to make it more suitable for switchboard mounting. The other model, Type EB, is an entirely new type, designed for use with one exciter only. Suggested applications include its use in small plants having only one generating unit and in providing individual regulators for plants operating two or more units in parallel. Variations of both models may be obtained for use with 180-cycle generators.



Type EF pictured; starts within ½ cycle (1/120 second) of change in generator voltage; Type EB, not shown, starts within one cycle. **Ward Leonard Electric Co.**, Mount Vernon, N. Y.

•

Steel Pin

The patented pin thread of this recently announced steel pin for low-voltage lines of all types is expanded from the steel tube forming the body. Instead of a nut and washer arrangement for fastening the pin in the crossarm hole, this pin uses an expanding wedge clip of stainless steel, fitted in slots at the bottom of the pin shank. One or two taps on an installing rod furnished spreads the clip into the sides of the pin hole, locking the pin in the arm. Pins may be salvaged many times without damage to the locking mechanism, it is claimed.

No. 800 Economy Pin; designed for normal loading of 800 lb.; fits in 11/16-in. crossarm hole. **Hubbard & Co.**, Pittsburgh.

•

Reflector

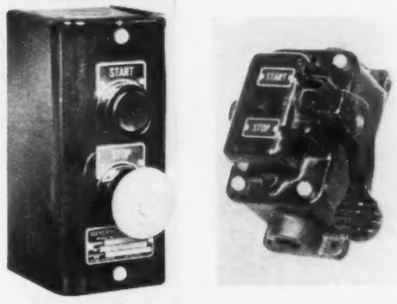
"Stock-Bin-Lite," for 60-, 75-, 100- and 150-watt lamps. **Benjamin Electric Co.**, Des Plaines, Ill.

This reflector is designed to provide uniform lighting for bins, shelves and stacks in stockrooms, tool cribs and libraries. Deep, trough-shaped reflector directs light downward to bins near the floor, while the V-shaped deflector bar below the reflector directs light upward to light the upper bins. Apertures in the ends of the reflectors allow light to pass which assists in building up illumination between units. Care has been taken to shield lamp filament from view when looking down the aisle.

•

Push-Button Stations

Two modifications of a heavy-duty push-button station have been developed recently. On one type (CR2940-2HK1) a mushroom head projects from the button so that a slap of the open hand will suffice to stop a machine controlled by the device. While developed primarily for use in bakeries, where it is important that dough from the operator's hands will not work into the station, it is also suggested for use on machines where the operator must wear very heavy gloves or asbestos mittens. The other type is a treadle-operated, watertight push-button station, for the operator who must have both hands free while starting or stopping the machine. Stops on the foot-pedal limit its travel in either direction, it is said, and both single- and double-action treadles are available.



Type CR2940-2HK1, left; Type CR2940-2A18, right. **General Electric Co.**, Schenectady.

Portable Pyrometer

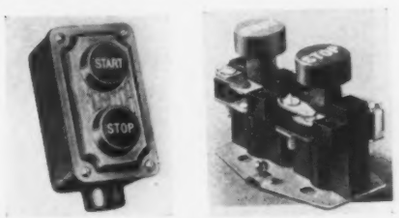
A new milli-voltmeter-type portable indicating pyrometer is offered for industrial use in measuring temperatures up to 3,000 deg. F. and employs a thermocouple and extension leads. Use of a cobalt magnet is said to allow increased sensitivity and a widened scale for more accurate readings, among other features. The high resistance millivoltmeter movement is double-pivoted and shielded to prevent the effects of stray fields. Molded bakelite case is of moisture- and dust-proof construction.

Portable indicating pyrometer; available in single and double ranges. **The Bristol Co.**, Waterbury, Conn.

•

Push-Button Station

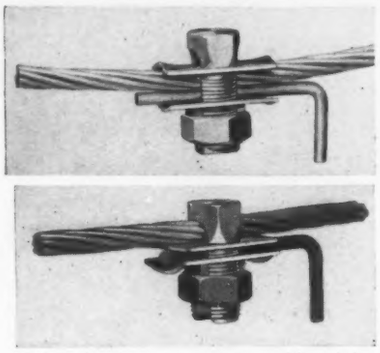
This push-button station has been developed to meet the demand for a compact, sturdy control station and has silver contacts of liberal size mounted on a molded bakelite base. Wiring to the station may be done by removing the cover, without disturbing the conduit connections. The die cast box is tapped for 1½-in. conduit connections. A wide variety of contact arrangements is available.



Push-button station. **Monitor Controller Co.**, Baltimore.

Aluminum Connectors

New connectors of rolled aluminum are said to approach bronze in tensile strength. They are available with extra-large aluminum or bi-metal washers, the latter type being designed for handling copper tap-offs from aluminum conductors. When used for this purpose, only copper contacts the copper conductor and only aluminum the aluminum conductor, guarding against the destructive electrical action of aluminum on copper, according to the makers.



L-M aluminum connector; bi-metal washers shown in lower illustration; for these wire sizes: Nos. 4, 2, 1 and 1/0 A.C.S.R. **Line Material Co.,** South Milwaukee.

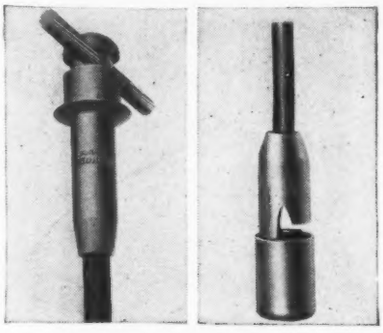
Induction Heating

Two new applications of induction heating are illustrated; the upper illustration pictures the heating, to 2,200 deg. F., of an end section of a large steel tube prior to a swaging operation. A special focus, single-turn coil is employed. In the lower illustration is shown the heater control panel and induction coil used in heating tube ends prior to a series of forging operations. High-frequency (2,200 cycles) power is applied to the coil and at the end of a minute 6-in. end sections of the two steel pipes are heated to 2,200 deg. F.

Installations by **Ajax Electrothermic Corp.,** Trenton, N. J.

Live Line Jumper Clamps

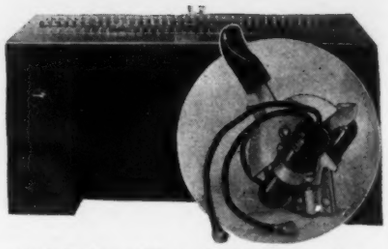
New live line jumper clamps are completely insulated in unbreakable soft rubber of high dielectric strength. They are designed for use in shunting defective equipment, by-passing low-voltage substation apparatus, for grounding, tapping, jumping faulty cutouts and disconnect switches, taking up slack in lines and when replacing old poles with new ones. One type (HR) has a hand guard well below the conductor to protect the lineman against contact with the live conductor.



"Redheads;" Types HR, left, and HW, right; each furnished in two sizes for 1/0 and 4/0 maximum line size. **Burndy Engineering Co., Inc.,** New York.

Remote Control Switches

Remote control of electrical circuits is said to be simplified by a recent development providing a universal control switch mechanism. Designed for mounting to the rear of a panel with only the switch handle protruding, it serves to give finger tip, master control over motor circuit contactors, safety and limit switches. One or more non-breakable metal mercury tubes, each said to be capable of making and breaking a 15-amp., 125-volt a.c. circuit without exposed arcing through countless cycles, are clamped in screw-down clips.



Installation picture of 37 Jefferson Toggle Switches for remote control of motor circuits in a mine. **Jefferson Electric Co.,** Bellwood, Ill.

Plug-In Instruments

Detachable instruments for general industrial use whose sockets may be cut into the conduit run feeding a motor or grouped in standard metal boxes to constitute a panel assembly are recent developments. They consist of two main units—a socket or mounting device provided with electrical connection jaws and a standard instrument mechanism mounted on a plate having electrical connection blades on the back and inclosed in a weatherproof housing of glass. Instrument is plugged into the socket and the units sealed with a tamper-proof sealing ring.

Detachable instruments; available as a.c. and d.c. ammeters and voltmeters, single and polyphase wattmeters. **Westinghouse Electric & Manufacturing Co.,** East Pittsburgh.

ENGINEERING DATA FROM MANUFACTURERS

Bulletins and catalogs now available to engineers by manufacturers and associations

RURAL ELECTRIFICATION—Three new booklets on the subject of rural electrification have been recently issued by General Electric's Incandescent Lamp Department, at Nela Park, Cleveland. "Light for the Farm" aims to show the farmer how he may obtain the advantages of good light at low cost in his home and in his business and to present this information in a way that may be quickly and easily understood. "As the Twig is Bent" is a review of General Electric's endeavors, during the past fourteen years, to promote rural electrification. Finally, "G. E. Offers a Field-Tested Farm Lighting Program" tries to show the part that lighting can play in making rural electrification possible and lists various aids this company now have available for this purpose.

DISTRIBUTION EQUIPMENT—Hubbard & Company, Pittsburgh, has just issued its new Catalog No. 38, giving a complete listing of its Pole Line Hardware as well as of the Peirce Construction Specialties. An interesting feature of the catalog is the practice of including a brief description on the use of the various cataloged items. Care has been taken to make the book a handy reference work and listing on their line: there are alphabetical, stock number and section indexes, and the titles of each section are repeated at the tops of the pages throughout the sections. Helpful tables of related technical data are included.

FIRE PROTECTION—Walter Kidde & Company, Inc., 140 Cedar Street, New York, have issued a 14-page pamphlet treating of the physical and chemical characteristics of fire and giving special emphasis to a discussion of proper protection against all types of fires.

FLAT SPRING DESIGN—Bulletin "D," prepared by the Research Department of the Beryllium Corporation of Pennsylvania, Reading, is entitled "How to Design Flat Springs to Meet Definite Requirements" and contains technical helpful data and information for manufacturers with problems in this field.

demands expansion!

CERTAINLY . . . expansion is as inevitable as progress. It will be a cautious expansion . . . one during which the desire to extend or increase service facilities is likely to be tempered with the necessity for keeping investments at a minimum.

This will be a natural result in view of experiences during the "depression era."

But . . . in your quest for economy in connection with expansion . . . do not consider that "one transformer is as good as the next" . . . regardless of price.

Purchasing transformers on that basis would be false economy.

Real economy consists in getting the greatest possible value out of your transformer dollar.

The rapid . . . but solid . . . growth of Moloney Electric Company since its inception in 1896 . . . is evidence of the wisdom of producing the finest transformers possible . . . and selling them at fair prices.

Strict adherence to this policy makes it possible for you to get the maximum value out of every dollar you invest in Moloney Transformers.

In considering transformers to take care of your increasing load . . . remember . . . for real economy . . .

Specify MOLONEY!

MOLONEY ELECTRIC

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TRANSFORMERS

MOLONEY TRANSFORMERS

The REAL MENACE is OIL!

RATS *might* gnaw your wire and cable, but *right now* oil and grease are destroying ordinary wire insulation somewhere in your plant . . . making it soft, pulpy, spongy and rotten. A natural setup for failure, leaking current like water out of a fire hose.

What to do about it? Easy! Just yank out the greasy, oil-sick stuff and replace with Rockbestos asbestos insulated wire, cable or cord. You'll not only have the oil and grease hogtied, but corrosive fumes and vapors, heat and moisture, and fire hazards as well.

If you are in doubt about the wire you need, let us recommend one. If you want to know more about our line of failure-free wires, send for samples or a catalog. Rockbestos Products Corporation, 853 Nicoll St., New Haven, Conn.

Rockbestos A.V.C. Motor Lead and Apparatus Cable

Also refer to Electrical World Buyer's Reference Number of Dec. 19, 1936, Part II

ROCKBESTOS A.V.C.
the wire with permanent insulation

BOOK REVIEWS

Fundamentals of Vacuum Tubes

By Austin V. Eastman. Published by McGraw-Hill Book Company, 330 West 42d Street, New York, N. Y. 438 pages, illustrated. Price, $4.

This senior text is a middle-ground mathematical treatment of vacuum tube phenomena and fundamentals. Minimum attention is given to circuits in which tubes may be used so as to concentrate on the internal behavior of the tubes. One attribute of the treatment is the systematic injection of qualitative description of the phenomena before the quantitative and mathematical treatment. Thus the beginner can grasp the usefulness of any of the multitude of tube types for accomplishment of a particular task in hand. No great effort is made to introduce application in detail, although many are mentioned in passing.

In addition to the radio-receiving tubes and their circuit adaptations there is treatment of rectifiers for power purposes, oscillators, frequency control, inverters, modulators, photosensitives and brief reference to X-ray tubes and d.c. transmission. The book is well supplied with charted characteristics and with illustrations of the forms which the various tubes take.

•

Primer of Electric Service Costs

By Roy Page. Published by Harper & Brothers, 49 East 33d Street, New York, N. Y. 94 pages. Price, $1,

While the author intended this book to serve primarily as an educational booklet for public utility employees, it may also be of value to others interested in this phase of public utility economics. He has designed it to present, in as simple language as the nature of the subject will permit, some of the principal factors affecting the cost of residential electric service and their relative effect and importance on rates, and includes additional material on financing and other utility operations. While he admits that much of the information is elementary, he also believes that it is information the average utility employee does not get in the course of his daily work, and that this knowledge will enable him to make his company's problems better understood by the people with whom he comes in contact. Effect of water power on electric costs is considered in one chapter, another deals with the holding company; two others compare municipal and private rates, "Taxless Towns" and "Yardsticks."

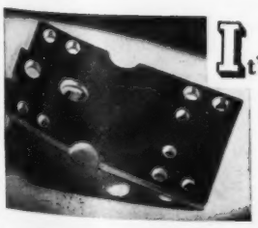
•

Motors and Control Applications

By George H. Hall. Published by McGraw-Hill Company, 330 West 42d Street, New York City, 259 pages, illustrated. Price, $3.

Those who know George Hall's series of articles about motor application and control in ELECTRICAL WORLD will find that he is here equally practical and direct in correlating motor characteristics with those of the driven load. Thus the book is for the designer and user of motor-driven equipment rather than for the motor designer. Seven chapters treat d.c. and a.c. types from the standpoint of their inherent and controllable characteristics. Four chapters

SOMEONE "PULLED A BOX"



It's a fire! A signal—an eye winks—a relayed signal—answering men spring out like jacks-in-boxes—coat-tails flying, before a gong dies—sirens scare a path through traffic—hose unbends—swells—there's water!... And only a moment ago, pale fingers "pulled a box" . . . The efficiency of water for fires depends upon the speed with which it can be rushed into action. Such speed requires perfect performance from a chain of electrical apparatus. SYNTHANE laminated bakelite contributes to the dependability of emergency fire-fighting equipment. SYNTHANE is used in fire-alarm telegraph systems, automatic controls for booster pumps and on motors, primarily because of its low moisture absorption, high dielectric strength and machineability. SYNTHANE laminated bakelite is a uniformly dense, solid material possessing a combination of desirable physical and electrical characteristics. It is tough, strong and light in weight; one of the most effective dielectric materials; chemically inert and corrosion resistant and easy to machine.

The uses for SYNTHANE are legion. Just as SYNTHANE is a material aid to fire-fighting, so its use may make a *material* difference in the reliability of your product. Write for "Synthane laminated bakelite for Mechanical Applications". (Please note on your request an indication of your requirements.) . . . SYNTHANE gives you MATERIAL SATISFACTION.

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SHEETS • RODS • TUBES • FABRICATED PARTS • SILENT STABILIZED GEAR MATERIAL

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deal with the controls and control accessories.

There follow other chapters on quiet operation, inclosures, shaftless motors, high-frequency motors, integral speed reducers and the adaptation of motor mounting to the application. Six chapters discuss the proper motoring of machine tools, woodworking equipment, fans and blowers, pumps and compressors, hoists and cranes. A final chapter tabulates the N.E.M.A. standards for frame sizes, mounting and shaft dimensions and tolerances.

The book is well illustrated and indexed and it avoids mathematics throughout, in favor of a clear verbal explanation why certain chracteristics of certain motors and controls make them the best selection for certain kinds of drive applications.

•

Mercury Arcs

By F. J. Teago and J. F. Gill. Distributed by Chemical Publishing Company of New York, Inc., 148 Lafayette Street, New York, N. Y. Price, $1.25.

Phenomena within the arc and at the electrodes are described qualitatively and characteristic magnitudes are injected on the introductory chapters. A chapter on constructional details is followed by others on grid control and voltage regulation on both mathematical and cyclic bases; a later chapter enlarges on wave form. Ratings for the requisite transformers are approached along analytical channels and then the matter of power factor is explored along with current harmonics and phase current distortions.

This little book is for students bent on principles rather than on practice or performance.

•

Metal Statistics

Thirtieth Annual Edition. Published by American Metal Market, 111 John Street, New York, N. Y. 592 pages. Price, $2.

Besides a collection of useful and informative data on economic subjects, this coat-pocket-sized book furnishes in its usual complete and compact form a record of production, consumption, imports, exports, stocks, price fluctuations and averages, data on various brands, analyses, trade terms, custom duties, etc., applying to finished and semi-finished ferrous and non-ferrous metal products as well as raw materials.

The new edition gives more comprehensive statistics on zinc, adds distribution of tin by industries, includes total production of steel plate and expands the daily price record.

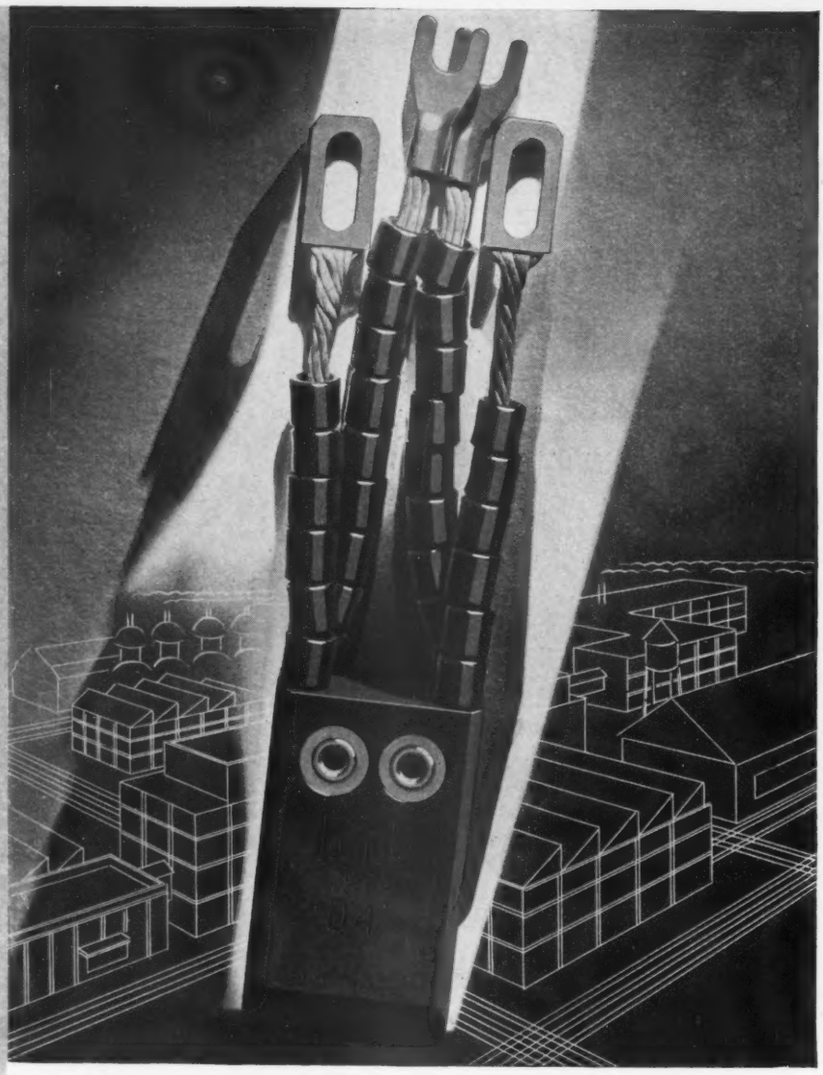
•

Zero to Eighty

By Akkad Pseudoman, E. F. Northrup. Published by Scientific Publishing Company, 46 Park Place, Princeton, N. J. 280 pages, illustrated. Price, $3.

The far side of the moon is little different from the side visible from the earth. This fact was first ascertained June 28, 1961, when the autobiographer encircled the moon in a rocket projectile propelled from an electric gun with a 1,000-meter barrel actuated by a six-phase alternator impressing 2,000 to 5,000 cycles on its exciting coils. The gun cost $2,000,000 and imparted a velocity of 3,150 km. per hour by applying 1.75 kw.-hr. of energy to each kilogram of the projectile (ten times the intensity of the Big Bertha of war days).

Dr. Northrup writes this fantasy out of his intense life in the scientific instrument



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. . . . *Brushes Must Hold Up*

The final test of a brush is it's performance under severe demands. Ohio Carbon Brushes have all the characteristics of a "top performer" with their absolute uniformity, ruggedness and their proven reliability under prolonged heavy loads, rush hour peaks and emergency demands. • Thousands of industrial plants thruout the world use and depend on Ohio Carbon Brushes for dependable, safe and efficient service. A complete line of Ohio Carbon Brushes for every service.

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Class and Distinction

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Monitor

CONTROL STATIONS

The advantage of selecting the proper control station for the particular application has resulted in Monitor's designing hundreds of these master stations, providing the utmost in safety and convenience in handling the control.

The push-button station illustrated above is Monitor's answer to the demand for a compact, sturdy control station, substantially built, with pure silver contacts mounted on a moulded Bakelite base, wiring easily accessible, cover removable without disturbing connections, colored moulded Bakelite buttons with functions clearly designated. Enclosing box and cover are die cast.

A wide number of contact arrangements is available with button markings suitable for almost every industrial purpose. This is a practical, general-purpose push button control station dignified in appearance and built for long, trouble-free service.

(*Write for Bulletin No. 9000R*)

Monitor

Monitor builds several hundred different styles of push-buttons and pilot circuit control devices. Any normal industrial requirement can be met with this variety of control stations. Modifications or additions, however, can be had for special applications. Monitor sales representatives in principal cities will gladly consult with you. Write us.

• • •

MonitorControllerCompany

Gay, Lombard & Frederick Sts.
BALTIMORE, MARYLAND

SELECTING the proper ILSCO lug is no trick at all when you consider the extra convenience of ILSCO markings. Stamped in clear view on the barrels of ILSCO Soldering Lugs are wire-size, ampere rating and Underwriters' Approval markings . . . everything to tell you which is the *right* lug for the job.

All soldering lugs, as well as the collars of our solderless type, are made of pure, seamless copper tubing drawn in our own mill. Simplicity of design characterizes our solderless lugs and makes them easier and more economical to use.

See these ILSCO Lugs on the FREE sample board illustrated above. Write for it.

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5629 Madison Rd., Cincinnati, Ohio.

Please send me, without obligation, your sample board displaying ILSCO Soldering and Solderless Lugs.

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INDIVIDUAL.....TITLE.....

MAIL THIS COUPON TODAY!

and induction furnace arenas. The build-up is recognized as his own autobiography, displaced only in time and into fictitious cognomens. To the electrical engineer the appeal is likely to be the appendices giving technical and mathematical support to the design of the electric gun, but it will do the prosy engineer no great harm to be disported a bit by the Jules Verne fantastic fiction which attends the lunar expedition.

•

Uniform System of Accounts for Electric Utilities

By National Association of Railroad and Utility Commissioners. Published by the State Law Reporting Company, New York. 213 pages. Price, $2.

This is the new accounting code approved at the 1936 convention and published by the officially designated publisher who also handles the proceedings of the association. It is recommended for adoption by the state commissions "with such modifications only as they may deem necessary in the public interest." New features are the stipulation of original cost for plant accounting with provision for "acquisition adjustments," a separate balance sheet account for excess of book cost in excess of acquisition cost, extensive reclassification of electric plant and segregation of commercial and new-business expense items. All transactions with affiliated interests are segregated and payments passed through a clearing account.

•

House Wiring

By T. W. Poppe. Published by Norman W. Henley Publishing Company, New York 256 pages, illustrated. Price, $1.

A practical contractor has revised this (eighth) edition to conform to the 1935 code, but retained the clear, simple language which tells in practical manner how to do house and garage wiring. Better yet, it often gives the reasons why the code makes certain requirements. How to handle the tools and the materials of wiring, how to do "old" work and lay out the new, how the new polarized wiring is applied, how to rearrange for heavy-duty appliances and how to do a thin-wall installation are typical instances of the thorough practicality of this pocket size "explainer."

•

Industrial Electricity and Wiring

By James A. Moyer and J. F. Wostrel. Published by McGraw-Hill Book Company, 330 West 42d Street, New York, N. Y. 500 pages, illustrated. Price, $2.75.

Changes in the National Electrical Code and in available wiring materials since the first edition (1930) have been observed in this second edition. It remains a practical interpretation of wiring practice and the regulations under which wiring is done; its objective is proficiency based on intelligent observance. In addition to the technique of the electrician, there are chapters on the calculation of wiring systems and on estimating their cost.

The technique chapters deal with proper application of the various types of wiring, splicing, appliances, wiring for generators, motors, transformers, lighting, theaters, industrial lighting and control. Outdoor wiring and distribution for plants and buildings are covered in two chapters. The matter of grounding is quite thoroughly treated. Illustrations throughout are distinctly clear and instructive.

Wagner DISTRIBUTION TRANSFORMERS have all these PLUS VALUES:

Wagner types HEB-HE distribution transformers are manufactured in all commercial frequencies and voltages in sizes 1½ to 500 kva. For full information on Wagner distribution transformers write for Bulletin 180.

● **THEY ARE EFFICIENT.** Wagner Types HEB and HE distribution transformers have low core and copper losses and their ratio of losses are such that they have good all-year efficiencies.

● **THEY ARE WELL DESIGNED.** Due to precision of manufacture, careful selection of materials and parts, and intelligent engineering, Wagner transformers have all the features that are necessary for satisfactory performance, and yet they are unusually advanced in modern design.

● **THEY ARE THOROLY TESTED.** All parts and completed transformers are carefully tested to meet exacting specifications according to the latest transformer standards — an assurance that Wagner transformers are reliable, free from defects, and will give many years of continuous duty.

● **THEY WILL GIVE SATISFACTORY SERVICE.** Wagner transformers of today are the result of constant improvement in their mechanical design and efficiency, gained from the experiences of highly trained Wagner engineers and transformer users . . . working hand in hand . . . during 45 years of pioneering and developing. These years of experience have enabled Wagner engineers to determine the electrical designs that are best for satisfactory service.

● **THEY HAVE IMPROVED FEATURES.** Wagner transformers are representative of the latest developments in transformer design and manufacture . . . bushing and insulation coordination, steel tanks, protected and reenforced end-turns, non-aging silicon-steel cores, advanced core assemblies, extra-strong element structures.

● **THEY ARE CAREFULLY CONSTRUCTED.** In the coil winding, core construction, assembly and tank construction of every Wagner distribution transformer there is that extra skill and care that only experienced men under competent supervision, can impart into a product. Every step is double checked.

● **CONVENIENT SERVICE FACILITIES.** Because Wagner maintains 25 branch offices, warehouses, and service stations in all parts of the country, Wagner can give better and quicker service to your needs.

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6400 Plymouth Avenue, Saint Louis, U.S.A.

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For CONTINUOUS DUTY

OR

STANDBY SERVICE

attention is invited to pronounced engineering characteristics of

STERLING HIGH DUTY

INTERNAL COMBUSTION ENGINES

Dual valves in the head; counter weighted, dynamically balanced crankshafts, multiple ignition and other features that Sterling pioneered, permit continuous duty on gas or gasoline fuel at 900 R.P.M. Emergency duty at 1200.

STERLING ENGINES—*for peak load and standby*

GAS—GASOLINE—OIL ENGINES

One of two Phillips Pipe Line Stations equipped with Sterling Viking engines, driving Goulds pumps; operating on butane gas at 800 R.P.M., on constant duty.

12 to 565 B.H.P.
Gas or gasoline

Crankless opposed-piston Diesel engines on test during American Water Works Convention.

STERLING ENGINE COMPANY

Home office and plant
1270 Niagara Street
Buffalo, New York

Dept. C-2

Branch Office
900 Chrysler Bldg.
New York, N. Y.

REA Allotments Made; Contracts Executed

During the month of April Rural Electrification Administrator John M. Carmody announced sizable allotments for line construction and the execution of many loan contracts. Among the larger allotments and contracts are:

Allotments

Alabama — Clarke-Washington Electric Membership Corporation, $55,000, 52 miles of line, 168 customers; Cherokee County Electric Membership Corporation, $310,000, 228 miles of line and a generating plant, 1,000 customers.

Idaho—Co-operative rural electric distributing company now being formed for Benewah, Latah and Shoshone counties, $270,000, 245 miles of line, 800 customers.

Kansas—Co-operative now being formed for Brown, Atchison and Nemaha counties, $100,000, 100 miles of line; co-operative now being formed for Saline, Ottawa and Dickinson counties, $254,651, to build about half a proposed project including some 530 miles of line to serve 1,759 customers.

Mississippi — Co-operative now being formed for Leake, Neshoba and Scott counties, $115,000, 121 miles of line, 509 customers; co-operative now being formed for Hancock and Pearl River counties, $87,000, 87 miles of line, 605 customers.

Pennsylvania—Southwest Central Rural Electric Co-operative Association, $280,000, 281 miles, 1,000 customers.

Michigan—Co-operative now being formed in Lenawee, Washtenaw and Monroe counties, $250,000, considerably over 100 miles of line (first section) and a generating plant for entire project, 2,296 customers. Quinault Light Company, $2,000,000, 1,800 miles of line and a generating plant, 5,500 customers.

New Jersey—Co-operative now being formed in Monmouth and Middlesex counties, $113,000, 101 miles, 400 customers.

Loan contracts

North Dakota—Cass County Electric Co-operative, Inc., $440,000, 405.5 miles of lines, 1,280 customers.

Illinois—Illinois Rural Electric Company, $150,000 for construction of generating plant to serve rural electric distribution lines it now has under construction. The project will bring electricity to 2,326 customers over 622 miles of line.

Kentucky—Salt River Rural Electric Co-operative Corporation, $315,000, 330 miles, 1,000 customers.

Minnesota—South Central Electrical Association, $210,000, 210 miles, 630 customers. Negotiations are under way to secure wholesale energy from the Northern States Power Company. Nobles Co-operative Electric Association, $230,000, 230 miles, 592 customers.

Washington—Inland Empire Rural Electrification, Inc., $455,000, 463 miles, 1,530 customers. Wholesale power will be supplied by a generating plant to be built with REA funds. REA has already allotted $90,000 for this purpose.

Pennsylvania—Southwest Central Rural Electric Co-operative Association, $400,000, 402 miles, 1,432 customers. This supersedes a previous contract for $120,000.

Wisconsin—Clark Electric Co-operative, $700,000, 674 miles, 2,078 customers. Energy will be supplied by a generating plant to be

No. 8 of a series

successfully serving an

ACTIVE MARKET

demands a publication with

EDITORIAL VITALITY

which in turn makes

KEEN READERS

who are preferred by

ALERT ADVERTISERS ✓

. . . . . .

that's Electrical World

. . . . . .

• Bakelite Corporation's Success in the Electrical Field is backed by Consistent Advertising . . . . . *in Electrical World, of course*

A few years after Dr Baekeland introduced his new material to the electrical industry, the first advertisement of the General Bakelite Co. appeared in Electrical World, — November 3, 1910 (see above). Since that time, Bakelite materials have served every department of the electrical industry — and Bakelite advertising has continuously carried the message of Bakelite development to the electrical industry through the pages of Electrical World.

In developing recognition of the name and product, in selling the advantages of the material, in opening up new applications, in building a firm foundation for specific sales effort, Bakelite Corporation's advertising in Electrical World has been an important integral part of the sales development program since its inception, more than 26 years ago.

Like "Bakelite," many leaders in the electrical industry realize that they get a larger share of the business by providing better values and by doing a consistently better job of advertising — in Electrical World, of course.

ABC ELECTRICAL WORLD ABP

A McGraw-Hill Publication

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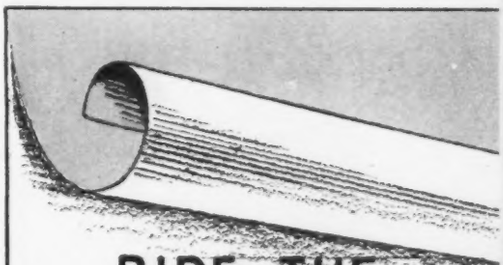

RIDE THE UPWARD TREND
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THE BURNDY

MOLE

FOR UNDERGROUND CABLE CONNECTIONS

REDUCE the expense of underground splicing and tapping with the Burndy Mole! This insulated solderless multiple tap eliminates costly junction boxes . . . speeds up the making of service taps and secondary connections . . . allows for future expansion without destroying the joint . . . guards against the effects of periodic flooding, oils and sewage.

WRITE FOR MOLE CATALOG

BURNDY

ENGINEERING Ⓑ COMPANY, INC.

459 E. 133d ST., NEW YORK, N. Y.

built with REA funds. Pierce-Pepin Electric Co-operative, $330,000, 333 miles, 982 customers.

Nebraska—Southern Nebraska Rural Public Power District, $475,000, 435 miles, 1,825 customers.

Iowa—Maquoketa Valley Rural Electric Co-operative, $305,000, 318 miles, 955 customers.

Texas—Denton County Rural Electric Company, $530,000, 555 miles, 2,464 customers.

Michigan—Tri-County Electric Co-operative, $400,000, 350 miles, 1,975 customers

•

Chicago Air Conditioning

Air-conditioning installations contracted for in Chicago in April totaled 60, an increase of 33 per cent over the corresponding month last year, Commonwealth Edison Company reported last week. The capacity of these installations totaled 1,044 hp., compared with 1,018 hp. in April, 1936. This is new all-time high record for the month of April, both in number and capacity of installations.

The largest group of air-conditioning contracts closed in April was for restaurants, seventeen being reported in that classification. A total of 1,526 air-conditioning plants were installed or contracted for in Chicago at the end of April, 1937.

•

Trolley Buses for China

The General Electric Company of China has received a contract for 70 four-wheel single-deck trolley buses, power rectifier plant, transformers, switch and control gear, 22 miles of overhead trolley line and other equipment. This equipment will be manufactured by the company and its subcontractors in the United Kingdom. The 90-hp. series motors will be made in the Birmingham works. The contract is in connection with introduction of the buses in Canton, China.

•

Promotes Electric Gifts

The newly formed Rocky Mountain Electrical League is co-operating with the Edison Electric Institute in promoting "Electrical Gift Month" with dealers and distributors actively engaged in the campaign.

•

Opens New Office in Dallas

To provide better service facilities for its customers in the Southwestern territory, Cutler-Hammer, Inc., Milwaukee, has opened a new sales office in Dallas, Tex., with headquarters in the Sante Fe Building.

Manufacturing AND MARKETS

Refrigerator Sales Show Gain in April

Domestic sales of household electric refrigerators in April totaled 311,769 units, valued at $26,858,772, according to report of the National Electrical Manufacturers Association. This compares with 276,721 units, valued at $22,715,767, in April, 1936.

World sales for April totaled 338,214 units, valued at $28,898,030, as against 299,217 units, valued at $24,272,697, a year ago.

For the first four months of this year domestic sales totaled $1,027,640 units, valued at $88,373,058, as against 796,294 units, valued at $65,270,216, in the same period last year.

World sales for the first four months this year totaled 1,110,143 units, valued at $94,535,570, against 854,903 units, valued at $69,508,616, in the same period last year.

•

Habirshaw Cable Makes Addition to Yonkers Plant

Wylie Brown, president of Phelps Dodge Copper Products Corporation, announced this week the placing of a contract for the erection at Yonkers, N. Y., of an addition to the plant of the Habirshaw Cable and Wire division. The new plant will make all types of insulated power cable used by public utilities and industrial companies. It will more than double the Habirshaw facilities.

Stone & Webster are the engineers and the Austin Company is the general contractor.

•

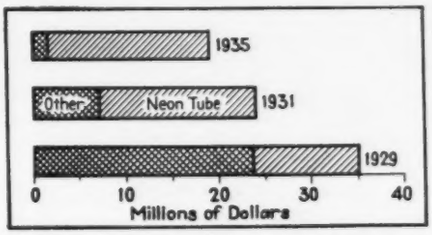
Stage Electric Service Shows

The women's division of the Electric Association of Chicago has solved the problem of getting women to know a great deal about the use of electrical service and appliances by staging a series of playlets. The shows are staged in the auditorium of the Chicago Lighting Institute and demonstrate proper wiring, lighting and use of household appliances, according to Hazel Brown, secretary.

•

$19,000,000 for Electric Signs

Neon tube signs to the value of $17,209,433 were produced in 1935, according to preliminary figures compiled from returns of the Biennial Census of Manufactures for that year and released by the Bureau of the Census. This value was only slightly more than the amount in 1931, but it shows an increase of 51 per cent over 1929. No comparable figures are available for 1933.



Value of electric signs and advertising devices manufactured

The report reveals a remarkable and progressive decrease in "other electric signs and advertising devices" to approximately one-fourth of the value in 1931 and only 7.6 per cent of the value in 1929.

While the combined values were 21 per cent less in 1935 than in 1931, the decrease was no greater than that of the entire "signs and advertising novelties" group including non-electrical types; the electrical constituted 34 per cent of the total in each year.

The statistics here given have been abstracted from a preliminary report on signs and advertising novelties. It is not apparent from the report whether the term "neon-tube signs" is to be taken literally or whether it includes other gaseous conductor tubes. Nor is it possible to separate other electric signs and advertising novelties.

Electrical Signs and Advertising Devices

Value of Products, 1935, Compared with 1931 and 1929
(Preliminary figures)

	1935	1931	1929
Neon-tube signs	$17,209,433	$16,783,098	$11,373,028
Other electric signs and advertising devices	1,783,252	7,208,596	23,533,905
Total	$18,992,685	$23,991,694	$34,906,933

•

Air-Conditioning Equipment Sales Hit New High Record

Installed cost of equipment sold by members of the Air Conditioning Manufacturers' Association broke all records in the first four months this year, aggregating $41,311,301, an increase of 180 per cent over sales of $14,756,992 in the same period last year, according to William B. Henderson, executive vice-president.

April sales were the second highest of any month in history, being $9,663,009, an increase of 156.8% over a year ago, when sales totaled $3,751,015.

•

Canadian General Electric Business Showing Increase

Business of Canadian General Electric Company so far this year is showing a substantial improvement over a year ago, with indicated bookings running ahead in the vicinity of 50 per cent, according to A. E. Dyment, chairman.

Mr. Dyment said that a great deal of the improvement has come in the merchandising division. Revival of de-

mand from heavy industry, which first made itself felt less than a year ago, is steadily expanding at the present time.

•

Manufacturers Make Sales Assignments

The following announcements have been made recently by electrical manufacturing companies, covering sales assignments:

Pacific Electric Manufacturing Corporation has announced the appointment of Arvid Wickstrom as representative in the Minneapolis territory with offices in the Plymouth Building. His territory covers Minnesota, Wisconsin, North Dakota, South Dakota as well as portions of Michigan and Iowa.

Frank E. Flynn has been placed in charge of the Warren-Niles district of the Republic Steel Corporation.

Stuart Walters has been added to the sales organization of the Tips Tool Company, to travel the states of Illinois, Indiana, Kentucky and western Tennessee. He was formerly with the Suburban Electric Corporation of Dunlap, Ill. David C. Hubbard is a new member of the engineering department and is in charge of new developments, production engineering, etc., being located in the office and factory at Taylorville, Ill. A graduate of Purdue University, he was formerly associated with the Cincinnati Gas & Electric Company.

Trumbull Electric Manufacturing Company has transferred C. E. Burt from the Plainville, Conn., factory to the Boston district to succeed E. E. Frost, now located in Nashville, Tenn. P. H. Kramer has been appointed salesman in Chicago to succeed G. T. Myers, now in St. Louis. S. B. Storer transferred from St. Louis to Ludlow factory office; C. D. Wiseman from Dallas to Kansas City. W. V. Fisk has been appointed Texas representative with headquarters in Houston.

•

Plans Plant Improvements

American Steel & Wire Company will spend $4,000,000 for rearrangement and rehabilitation of facilities at its Cuyahoga Works, according to an announcement by C. F. Blackmer, president. The appropriation is intended to be used for the improvement of the cold rolled strip department, which also makes rods, wire and stainless steel. The work is expected to be completed within a year.

New York Metal Prices

	May 26, 1937 Cents per Pound	June 1, 1937 Cents per Pound
Copper electrolytic	14.00*	14.00*
Lead Am. S. & R. price	6.00	6.00
Antimony	14.75	15.00
Nickel ingot	35.00	35.00
Zinc spot	7.10	7.10
Tin Straits	56.625	55.625
Aluminum, 99 per cent	20–21	20–21

* Delivered Connecticut Valley.

Field Reports on Business

Strikes in the steel industry are expected to slow up business in allied lines. Electrical manufacturers report production holding up well. Retail electrical appliance business appears promising for the summer, with refrigerator and range sales at high levels.

NEW ENGLAND

Orders for electrical equipment in this district are now being confined to smaller lots than previously and are becoming quite widely diversified. During the past week loom motor sales of one nationally known manufacturer were very strong and this month will record a high peak in orders for this special type of motor. General-purpose motors are selling steadily, but orders are now characterized to some extent by demands for single units. Interest in heavy electrical machinery has declined rapidly during the past fortnight. There are, however, a number of projects involving power plant generating machinery which, while temporarily held up, will be carried out when more settled conditions appear.

Central station supplies are dull; some wire and cable orders are reported; for instance, one for about 38,000 lb. of three-conductor submarine cable for power service. An order has been received by the General Control Company for 740 cam lever switches for the Western Union and another from California "Tech" for use with the new 200-in. Mt. Palomar telescope.

Interest in electric lighting is active; floodlights for automobile service stations are selling well; street lighting is progressing. Fall River, Mass., is considering improvements of its lighting facilities. Interior lighting on a large scale involving considerable electrical equipment is included in the contract for the new Suffolk County courthouse, recently signed at a contract price of $3,687,000. Merchandising is steady in Vermont and the Boston area.

PACIFIC COAST

Public building and purchasing by utilities continues excellent, and its continuance indefinitely is assured by many large public structures planned along the coast and such projects as the California Central Valley, the proposed $10,000,000 Alaskan air base near Fairbanks, the $15,000,000 electrification for 1938 of Bay Bridge suburban traffic and terminals. Oregon cities such as Roseburg, Albany and particularly Salem, with its PWA State library and other structures, are busy.

General contractors in petitioning for PWA continuance estimate that $350,000,000 would be required from this source during the next two years in northern California alone. Smaller industrials such as food plants and miscellaneous warehouses averaging $150,000 each are being widely built. Though all this work insures actual electrical orders and, therefore, a good future volume, there is considerable uncertainty over labor conditions and wholesalers are rapidly reducing stocks to a consistent minimum. Prices remained in an uneasy equilibrium during May with only scattered and unimportant advances, though copper is stronger. A $135,000 inquiry for 110,000-volt oil-filled cable for East Bay installation is still pending. Recent heavy machinery orders include a 2,000-kva. turbine, value $60,000, for installation in a central California paper plant; a group of 400 hp. motors, value $15,000, for an oil refinery, and three electric locomotives, value $50,000 each, for a Utah copper mine. Stock sizes of motors and transformers are dropping in input, though still close to coast factory capacity. Pumping equipment demand is now past its peak after exceeding by 25 per cent last year's value.

NEW YORK

With the announced intentions of the C.I.O. to organize utility workers the prospects of some unrest in the industry appears a certainty. Just how far the C.I.O. will get in such a nation-wide movement is problematical. At any rate the drive, no doubt, will result in some upward adjustment of wages. It is not likely that the increased operating costs can be passed on to consumers in higher utility rates. This means a slowing down in the upward trend in earnings.

Opinion among utility leaders is that expansion of plant and distribution facilities will be continued at a high rate during the summer. Electrical manufacturers are preparing for such business and expect production to be maintained at a high level. Production in all lines appears to be holding up well.

Refrigerator, range and air conditioning sales are reflecting summer buying. Retail outlets report only a slight recession in business at present, but expect good business during the summer months. Rehabilitation of industrial plants is resulting in sizable orders for electrical equipment. The high rate of residential building in this section is expected to result in great demand for household electrical appliances.

CHICAGO

Irregularities marked the business picture during the past week. Three of the large independent steel companies were affected by strikes, considerably curtailing activity in the southern industrial district. The walkout is not expected to be of great duration, but there is considerable apprehension for fear that the epidemic may next affect the packing industry. The packing plants in the stock yards have been fertile ground for electrical equipment orders because of the large amount of expansion and rehabilitation work in progress.

Merchandising has apparently recovered from a temporary slump and is making favorable progress. The demand for the larger household appliances is especially good. Wholesale business improved slightly over the previous week, while the group reported an increase of 75 per cent in April over last year. Metering devices are in steady demand, one manufacturer reporting the dollar volume of sales double last year's figure.

Wire and cable orders declined slightly, while small motors and control equipment registered moderate gains. An order for 220,000 ft. of 3½-in. fiber conduit was reported.

Engineers know—

THAT *Ozalid* WHITE PRINTS ARE EASIER TO READ . . . EASIER TO CHECK EASIER TO CORRECT . . . EASIER AND MORE ECONOMICAL TO MAKE . . .

—but do your executives know

ABOUT ALL OF THESE *Ozalid* ADVANTAGES?

Engineers, draftsmen, and checkers have long acknowledged that clear, clean white prints are easier to read, check and correct; prevent those costly mistakes often caused when details or corrections are obscured by a confusing blue background.

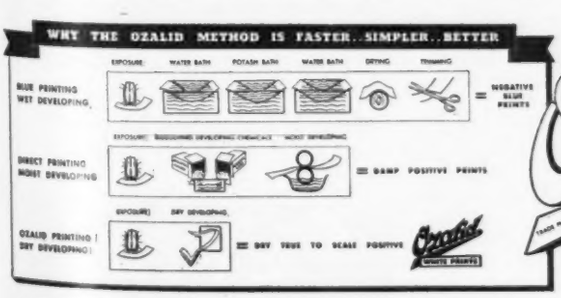
But here is an improved method of making true-to-scale white prints that is acclaimed by executives, too, as the simplest, cleanest, fastest, cheapest and most versatile process developed . . . not only for engineering, but for production, service and sales.*

The Ozalid Process saves both time and money in making prints. Contrast the two simple steps of this advanced process with those of the conventional blueprinting process or with other direct printing methods.

There are no fussy solutions or intricate baths to prepare . . . no confusion of tanks or plumbing, no drying, no trimming, no waste. The unit is so clean and compact that it could be used in a private office!

Then, too, substantial savings in drafting time can be effected with Ozalid Transparent Duplicates. One user recently reported that the use of the "blocking out method" has reduced the time of preparing new drawings from days to minutes . . . another has cut the cost of making special application drawings for a standard product from $10.00 to $1.10!

The total savings secured often exceed the moderate first cost the first week . . . and then pay a generous dividend throughout years of service. Whether you are engineer, draftsman, or checker, send for complete information on the Ozalid Process . . . be the first to show your executives how to get better prints at the lowest cost.



Sales and Advertising Managers . . .

have found that the Ozalid Process produces ideal prints for special presentations, sales manuals, graphs and standards books.

Ozalid

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354 FOURTH AVE., NEW YORK, N. Y.

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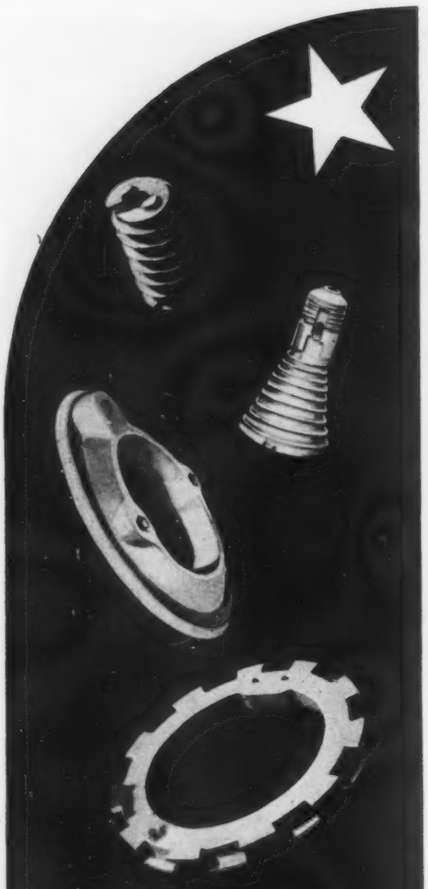


Starring

THERMOLAIN

A heat-resistant refractory porcelain for electrical heating devices where sudden changes in temperature occur. Used extensively in electric ranges, irons, air heaters, radiants, rheostats and electric immersion heaters.

LAVOLAIN

Dense, heat-resistant porcelain recommended for bushings, coils and rods. High mechanical and dielectric strength.

NU-BLAC

Good quality insulating porcelain that will not show assembly soiling. Furnished either glazed or unglazed.

MAKERS OF ELECTRICAL PORCELAIN SINCE 1899

The STAR PORCELAIN COMPANY TRENTON NEW JERSEY

Recent Rate Changes

West Penn Power Company has filed a schedule of rate reductions with the state Public Service Commission whereby its commercial users, schools and churches would save approximately $279,000 a year. The rates will be effective starting June 16, if approved by the commission. The company reduced rates to domestic consumers last March. By the proposed new scale, the company says, 18,000 of its 23,000 commercial users will benefit in the amount of $242,000. Public schools and churches would benefit by a cut of $37,000 annually.

Puget Sound Power & Light Company will reduce its electrical rates to schools, churches and halls in the rural districts outside of Seattle approximately 18½ per cent. The reduction will save consumers $17,000 a year. New and lower street lighting rates have also been filed by the company with the Department of Public Service at Olympia. The reduction on the larger sizes of street lights exceeds 30 per cent, and provision is made for the installation of the latest street lighting equipment. The new rates and more efficient lighting systems have been worked out by the company's engineers, Frank McLaughlin, president, said to cooperate in a national safety movement.

Kentucky Public Service Commission has announced extension of its investigation of major Kentucky utilities to include the rates and practices of a number of smaller companies. The investigation will include particularly companies furnishing light and power service to small towns and rural areas. Rate comparisons concerning the smaller power companies, James Cammack, Jr., a member of the commission said, indicate that the charges made for service by most of them are "far out of line" with the rates in similar communities served by other companies. Commissioner Cammack named eight companies: Central States Power & Light, Community Public Service, Cumberland Public Service, Cumberland Public Utilities, Kentucky Edison, Kentucky Electric Development, Kentucky-West Virginia Utilities and Southern Public Service.

Arkansas Utilities Commission has approved a schedule of wholesale rates of 1.38 cents a kilowatt-hour offered by the Oklahoma Gas & Electric Company for service to rural electrification projects. This action follows closely upon recent acceptance by the commission of the offer of the Arkansas Power & Light Company of a wholesale rate of 1.23 cents a kilowatt-hour. The Oklahoma Utilities Commission recently approved the schedule of the Oklahoma Gas & Electric Company. Territory in Arkansas served by the Oklahoma company is in Crawford, Sebastian, Johnson, Logan and Franklin counties.

Kansas City Power & Light Company has been ordered by the Missouri Public Service Commission to reduce its rates for electric service furnished small commercial consumers in Kansas City.

Rockland Electric Company has made a rate reduction, amounting to approximately $30,000, according to announcement made by Harry Bacharach, president of the New Jersey Public Utilities Commission. The reduction will be spread among 7,600 consumers.

Brooklyn Edison Company and the Shelter Island Light & Power Company have filed lower rate schedules with the New York Public Service Commission. Brooklyn Edison has altered special provi-

Starring

VITROLAIN

A strong, dense, low-porosity porcelain. Can be made to meet specifications for as low as .25% absorption and can be surfaced to resist atmospheric moisture entirely. Especially applicable in manufacture of railroad signals, radio receivers and telephone fuse blocks.

STAR METER SEAL

A permanent porcelain seal for all types of CS meters. Clips over bottom of meter cover locking ring. Must be destroyed to open meter. Prevents thousands of dollars loss by current diversion. Send for sample.

MAKERS OF ELECTRICAL PORCELAIN SINCE 1899

The STAR PORCELAIN COMPANY TRENTON NEW JERSEY

MEMO— RE—PARKWAY CABLES—

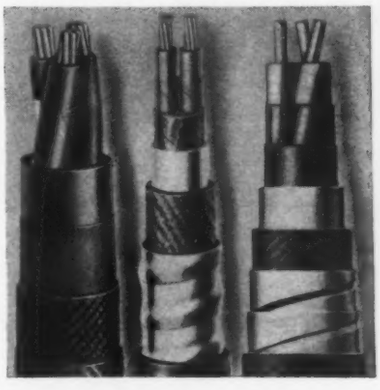
SPECIFY AMERSEAL NON-METALLIC OR STEEL-TAPED PARKWAY CABLES

Made by American Steel & Wire Company

"MADE by American Steel & Wire Company" means a lot to buyers of electrical wires and cables. It means absolute reliability based upon years of satisfactory service from thousands of installations.

Amerseal Non-metallic Parkway Cables are designed for direct burial in earth, without external protection. In these cables a jacket of tough vulcanized rubber, covered with a heavy layer of asphalted jute, protects the insulated conductors from mechanical injury and from action of moisture, earth acids and alkalis. This unique construction gives full protection to the cables, yet you will find them light in weight, flexible, easy to handle and extremely economical.

Our Steel-Taped Parkway Cables have rubber insulated conductors protected by a lead sheath and by one or more layers of metallic armor. Use our Armorlokt or flat steel-taped metallic cables wherever added mechanical protection is necessary. For complete information, send for our new Parkway Cable catalogue.



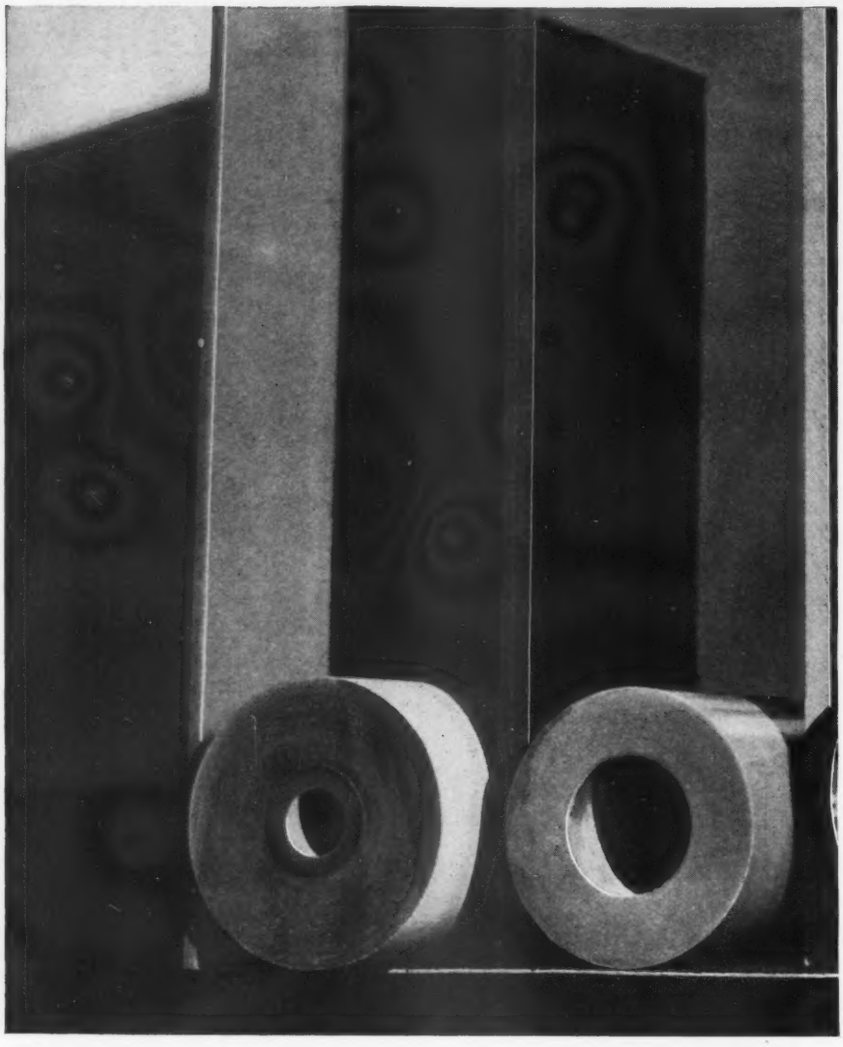
PARKWAY CABLES

AMERICAN STEEL & WIRE COMPANY

Rockefeller Building, Cleveland

Columbia Steel Company, San Francisco, *Pacific Coast Distributors* · United States Steel Products Company, New York, *Export Distributors*

UNITED STATES STEEL



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for lasting mechanical, thermal and electrical INSULATION

DILECTO — a laminated phenolic insulating material — is phenol Fibre at its best. Made in sheets, rods and tubes, which are readily machined, punched or stamped, it lends itself to the fabricating of countless insulating parts. The high mechanical and electrical properties of DILECTO are lasting and permit its use as a structural insulating material.

DILECTO sheets, rods and tubes are made in a variety of standard sizes. There are many grades to meet specific thermal, mechanical and electrical insulating problems. The Continental-Diamond Laboratory will be glad to study your particular insulating problem and recommend a grade of DILECTO which will satisfactorily meet your requirements.

The DILECTO catalog gives complete information on standard sizes, contains complete technical data on all grades, and provides information for the fabrication of all forms of DILECTO. Send for a copy of it today.

CONTINENTAL–DIAMOND FIBRE CO.
NEWARK, DELAWARE
Represented in Canada by
DIAMOND STATE FIBRE CO. OF CANADA LTD., TORONTO

sions of its secondary voltage power rate, reducing charges in the private street lighting rate. The changes are estimated to save approximately $3,290 annually for about 194 customers in Brooklyn. Shelter Island Light & Power has filed rates which will mean a saving of approximately $1,600 a year to 500 of the company's 575 customers.

NIAGARA, LOCKPORT & ONTARIO POWER COMPANY has filed revisions of electric rates with the New York Public Service Commission which are estimated to save consumers $79,061 annually. General service will be rendered under a single rate which will replace the present block rate and optional demand rate.

•

Georgia Rate Case Deferred Until June 10 for Hearing

Georgia Public Service Commission has set June 10 for hearing on a rule *nisi* requiring the Georgia Power Company to show cause why its commercial rates should not be reduced. The postponement was made necessary by the sudden death of Judge Walter Colquitt, chief counsel for the Georgia Power Company for many years. Judge Colquitt had prepared the defense of the company to the rule *nisi* and it will be necessary for some one else to familiarize himself with the case.

•

Rate Hearings Postponed

Hearings on electric rates charged by the Georgia Power & Light Company have been recessed until July 14 by the state Public Service Commission. Counsel for the utility stated that it is not at this time qualified or ready to submit data and information. The company was called on by the commission to show cause why its residential and commercial rates should not be lowered.

Company officials at the hearing maintained the company "is not earning now, nor has it earned in past years, a fair and reasonable return on the money invested."

•

Twenty-six Utilities Cited

Following its announcement of a sweeping investigation of electric and gas rates in the state, the Louisiana Public Service Commission has issued citations to 26 utilities to "show cause . . . why your rates . . . should not be investigated, revised, modified and/or reduced in such manner as the commission may find appropriate." The commission ordered the utilities to place their complete records at the disposal of commission investigators.

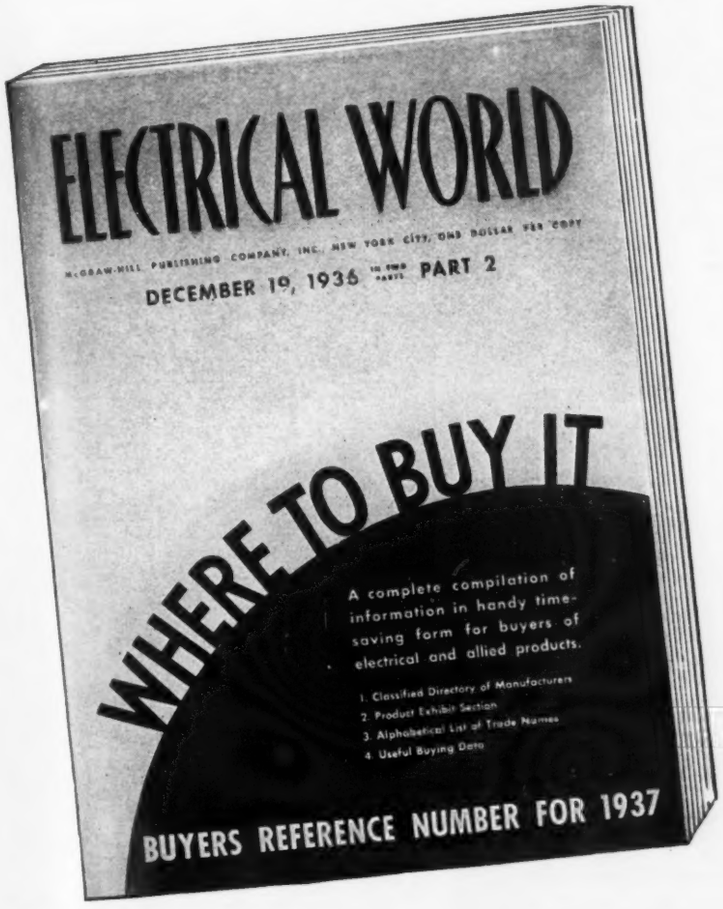
Here is a complete, handy index

of the electrical and allied products of some

3,300 MANUFACTURERS

Alphabetically arranged and supplemented, in many cases, by manufacturers advertisements giving detailed product information.

Keep this book handy — use it in planning your buying — it will save time and money for you!


ELECTRICAL WORLD
McGRAW-HILL PUBLISHING COMPANY, INC., NEW YORK CITY, ONE DOLLAR PER COPY
DECEMBER 19, 1936 IN TWO PARTS PART 2
WHERE TO BUY IT
A complete compilation of information in handy time-saving form for buyers of electrical and allied products.
1. Classified Directory of Manufacturers
2. Product Exhibit Section
3. Alphabetical List of Trade Names
4. Useful Buying Data
BUYERS REFERENCE NUMBER FOR 1937

The Electrical Buyers Guide for 1937!

●

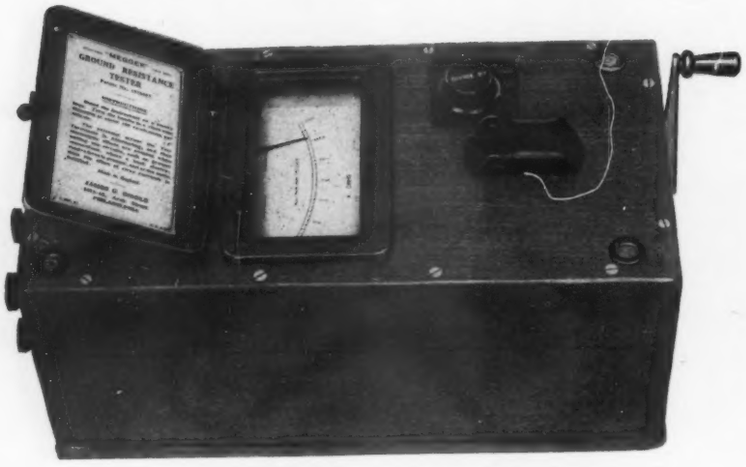
Revised and Published Annually by

ELECTRICAL WORLD

330 W. 42nd St., New York, N. Y.

GROUND TESTING COST REDUCED 70%

(THE EXPERIENCE OF A USER OF MORE THAN 100 "MEGGER" GROUND TESTING INSTRUMENTS)



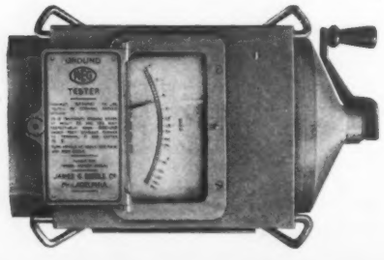
"MEGGER" GROUND TESTER

One company estimates that the old "hot spot" method of ground testing, using 2300 volts, cost an average of $2.00 per test. The method called for considerable equipment and a gang of three men, one specially trained to make "hot" connections.

When the "Megger" Ground Tester was adopted one man, without previous experience, made tests that were consistently more accurate than ever before and *at an average cost of 60 cents per test.* The "Megger" method also eliminated all "hot connection" hazards.

"Megger" and "Meg" Ground Testers have brought to problems of grounding and ground testing, the same features of accuracy, simplicity, ruggedness and reliability, that are so characteristic of "Megger" and "Meg" instruments for testing insulation resistance. Need more be said?

Catalog 1425-W contains a full description of these instruments, including principle of operation and suggestions for their application. Your copy will be sent on request.



"MEG" GROUND TESTER

JAMES G. BIDDLE CO.
ELECTRICAL AND SCIENTIFIC INSTRUMENTS
1211-13 ARCH STREET PHILADELPHIA, PA.

Motor Production Up 75 per Cent

An increase of 74.8 per cent in the value of electric motors (not including automotive or railway motors) manufactured in 1935, compared with 1933, is indicated in a special report based on data collected in the recent Biennial Census of Manufactures, issued by the Bureau of the Census. The amounts were $71,957,147 and $41,172,712, respectively.

The table presents the 1935 and 1933 figures for all classes of electric motors except those for automotive and railway use, for which statistics

Electric Motors, Except Automotive and Railway—Production, by Kind, Number and Value: 1935 and 1933

	1935	1933
Total value	$71,957,147	$41,172,712
Fractional-hp.:		
Under 1/20 h.p.[1]		
Number	2,379,512	1,009,170
Value	$4,244,553	$1,792,722
1/20 h.p. and over but under 1 h.p.[2]:		
Split-phase:		
Number	2,565,627	1,578,989
Value	$15,819,451	$9,063,074
Repulsion-induction:		
Number	542,682	773,737
Value	$7,148,032	$8,382,870
Universal:		
Number	516,777	
Value	$2,854,795	
Direct-current:		
Number	109,643	
Value	$1,445,464	
Other, and those not reported separately:		
Number reported:		456,257
Number	762,265	$4,507,775
Value	$4,802,287	
Number not reported, value	$608,446	
Fractional-h.p. motors built on frames as large as or larger than those for 1 h.p. open-type motors:		
Number	4,634	
Total rated capacity	3,222	
Value	$203,081	
1 h.p. and over:		
Direct-current:		
1 to 200 h.p., inclusive:		
Number	30,413	
Total rated capacity	278,636	
Value	$6,306,132	
Over 200 h.p.:		16,628
Number	158	$3,622,423
Total rated capacity	176,120	
Value	$2,183,113	
Alternating-current:		
Repulsion-induction:		
Number	68,153	
Total rated capacity	148,378	
Value	$2,579,565	
Polyphase-induction:		
1 to 200 h.p., inclusive:		
Number	224,321	
Total rated capacity	1,592,954	
Value	$20,202,777	
Over 200 h.p.:		172,394
Number and capacity reported:		$13,574,188
Number	233	
Total rated capacity	128,059	
Value	$1,323,330	
Number and capacity not reported, value	$111,996	
Synchronous motors (except fractional-h.p.):		
Number and capacity reported:		
Number	978	
Total rated capacity	263,206	
Value	$1,693,565	
Number and capacity not reported, value	$157,064	
Other (except automotive and railway):		
Number	1,222	
Value	$86,759	
Motors not reported by kind, number, or capacity	$186,737	$229,66

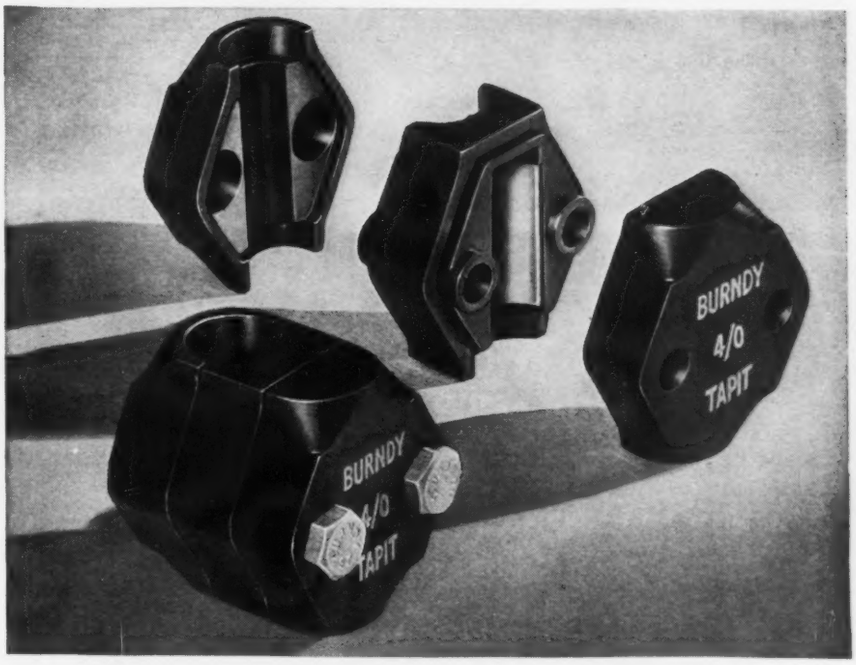
[1] Toy and other motors not rated in accordance with A. I. E. E. standards.

[2] Motors built on frames smaller than those of open-type motors having a continuous rating of 1 h.p. at 1,700-1,750 r.p.m.

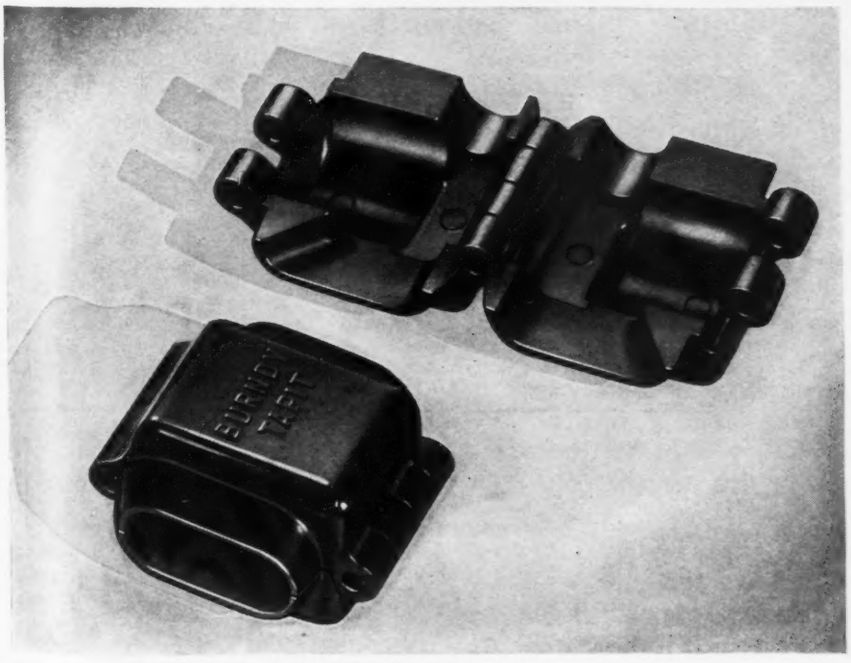
Safe, Compact Design *with Bakelite Molded*

THE USE of Bakelite Molded to replace bulkier, more brittle insulating material has brought important improvements in many electrical devices. Not only are the size and weight of products reduced in numerous instances, but also durability and ease of installation often are substantially increased.

Typical examples are the Bakelite Molded Burndy Tapits, illustrated: type PGK to insulate connections made with service connectors; type PG to join as well as insulate connections. Through their use, junctions are quickly made without soldering, and effectively insulated without tape or unstable dielectrics. Also, these devices provide ready removal for inspection.



The efficient design of these units is due in no small measure to Bakelite Molded. Combining mechanical strength, toughness, high resistivity and ready moldability, this material provides "shatterproof" insulation and unusual compactness. Its resistance to moisture, handling and weathering afford long service without depreciation.



Similar outstanding advantages are found in many other electrical products made from Bakelite Molded. We invite engineers and designers to obtain full details. Write for 48-page illustrated booklet 3M, "Bakelite Molded".

(Above) Heavy-duty Tapit of special, high-impact Bakelite Molded with copper connector block and metal end-plates permanently imbedded.

(Left) Tapit for use with service connectors, completely formed from Bakelite Molded. Both types molded for Burndy Engineering Company by Accurate Molding Company.

BAKELITE CORPORATION, 247 PARK AVENUE, NEW YORK, N.Y.
BAKELITE CORPORATION OF CANADA, LIMITED, 163 Dufferin Street, Toronto, Canada *West Coast:* Electrical Specialty Co., Inc., 316 Eleventh Street, San Francisco, Cal.

BAKELITE

The registered trade marks shown above distinguish materials manufactured by Bakelite Corporation. Under the capital "B" in the numerous sign for infinity, or unlimited quantity, it symbolizes the infinite number of present and future uses of Bakelite Corporation's products.

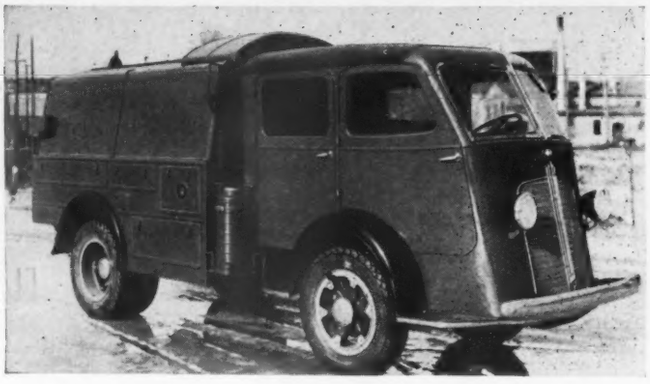
THE MATERIAL OF A THOUSAND USES

• Rugged • Light Weight • Long-Lived •

Highway BODIES

DESIGNED FOR DURABILITY AND APPEARANCE AS WELL AS ACCESSIBILITY AND CONVENIENCE

• Appearance for good will • Designed for the job • Comfort for the crew •



★ Highway Bodies serve the widest range of utility needs—they are designed with full consideration given to durability and appearance, as well as accessibility and convenience.

Highway Bodies are economically adaptable to today's requirements. They are furnished complete with Highway Winches, Derricks, and associated equipment to fully complete the line construction and maintenance truck.

Highway makes a complete line of bodies for Central Station line construction and service trucks. Highway Bodies are dependably and economically serving many utilities today.

Send for descriptive literature.

HIGHWAY TRAILER CO.
EDGERTON WISCONSIN

will be given in a later report. All figures for 1935 are preliminary and subject to revision.

Group values for 1935 and the corresponding increase in percent over 1933 are:

Type of Motor	Value	Per cent Incr.
Under 1/20 hp	$4,244,553	+137
Fractional hp.		
Split phase	15,819,451	+ 75
Repulsion-induction	7,148,032	— 11
Other	9,914,073	+120
1 hp. and over		
Direct current	8,489,245	+135
Alternating current	26,155,056	+ 93
Not reported by kind	186,737	— 19

The extensive use of motor-driven appliances is reflected in the fact that well over half the total value is comprised in the fractional-horsepower groups. Of the remainder, three-fourths is in alternating-current motors and about one-fourth in direct current. Aside from the negligible groups for which no classification was reported, the only type showing a decrease was the fractional-horsepower repulsion-induction motors, representing 10 per cent of the total value.

•

Refrigerators in England

Only 2 per cent of the houses wired for electricity in the United Kingdom at present have electric refrigerators installed. There are only 140,000 in use. Sales last year totaled 35,000, which are expected to be increased to 90,000 this year.

•

Carrier Installs Units

Twenty-two de luxe cars of the French Indo-China Government Railways are being fitted with Carrier air conditioning for use on the 1,050 miles between Hanoi and Saigon, principal cities of the country. Electric heating units are also being installed.

•

PWA Puerto Rico Loan

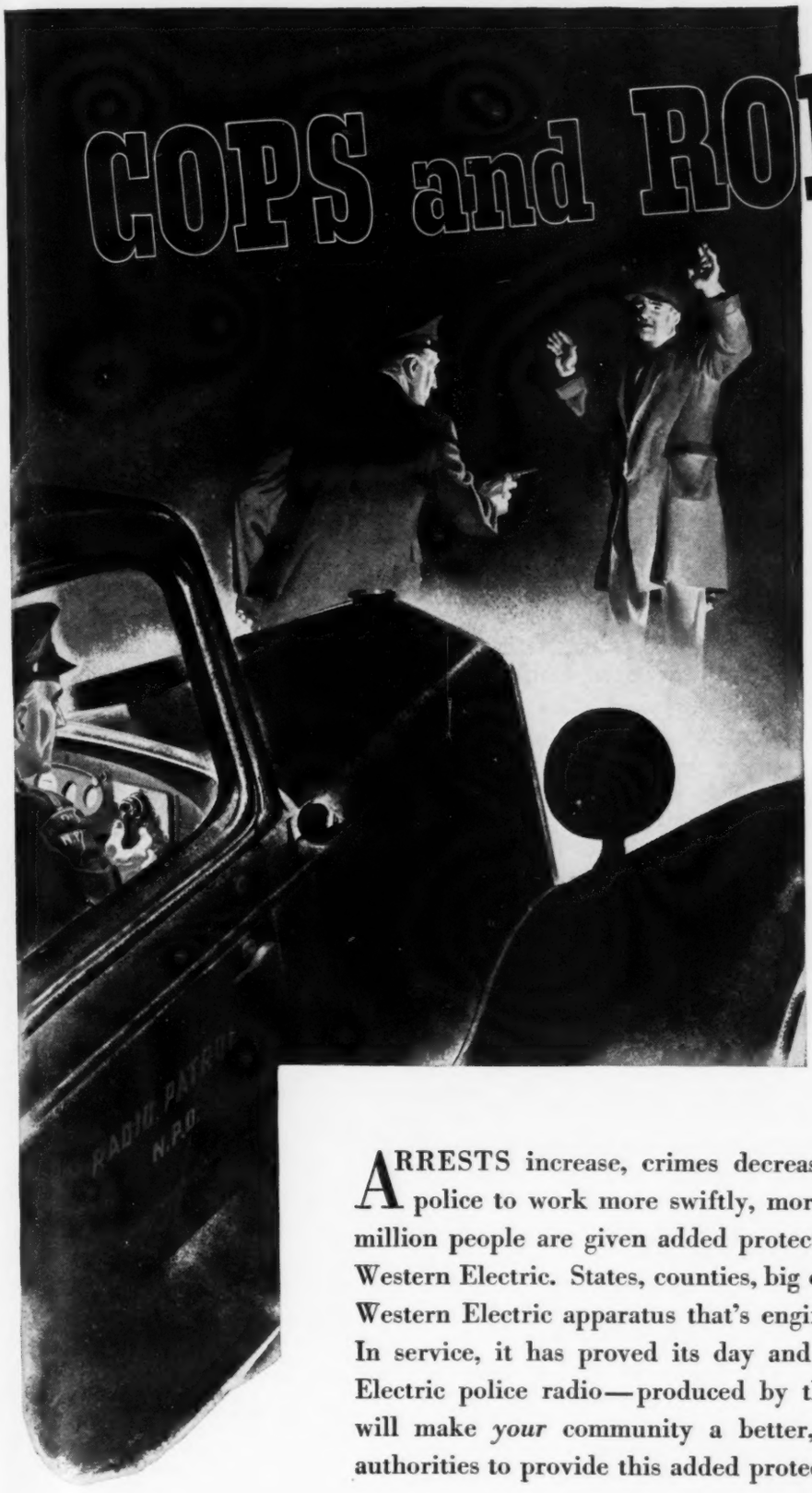
The PWA has announced that an allotment of $1,400,000 to the insular government of Puerto Rico has made possible the purchase of the electric distribution system of the Ponce Electric Company. The loan was made last August.

•

Appoint Service Agents

The Emerson Electric Manufacturing Company, St. Louis, Mo., announces the establishment of a new

COPS and ROBBERS



... too dangerous a game for law-breakers where the Police use

RADIO!

ARRESTS increase, crimes decrease, when radio telephone helps police to work more swiftly, more surely. ¶ Today more than 40 million people are given added protection by *one* make of equipment: Western Electric. States, counties, big cities, small towns, all have found Western Electric apparatus that's engineered to meet their exact needs. In service, it has proved its day and night dependability. ¶ Western Electric police radio—produced by the maker of Bell Telephones—will make *your* community a better, safer place to live. Urge the authorities to provide this added protection.

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Western Electric

LEADERS IN SOUND-TRANSMISSION APPARATUS

A GRIP FOR ALL NEEDS

No. 1628-5 B. "Chicago" Grip. Maximum opening .563. Minimum opening .115. Safe Load, 8,000 lbs.

Here's the new "Chicago" Grip capable of handling messenger or guy strand from 3/16 in. diameter up to 1/2 in. diameter. A genuine all purpose grip that can also be used satisfactorily on bare conductors, solid or stranded, from No. 6 to No. 4/0 seven strand copper and A.C.-S.R. up to No. 3/0. A grip that even satisfactorily handles the new three-strand "copperweld" conductor. The bronze-lined jaws prevent slippage. This new grip will afford a sure hold under all conditions, with loads up to 8,000 lbs.

DISTRIBUTED THROUGH JOBBERS

Foreign Distributor: International Standard Electric Corp., New York

The four pamphlets listed below will be sent without charge to anyone interested. Check the ones you want:

- ☐ Safety for the Pole Climber.
- ☐ Specifications on Linemen's Belts and Safety Straps.
- ☐ The Safety Factor on Linemen's Leather Goods.
- ☐ Pocket Tool Guide.

Mathias KLEIN & Sons
Established 1857 — Chicago, Ill. U.S.A.
3200 BELMONT AVENUE

field service station policy and the appointment of forty-one authorized service stations for their respective territories.

•

Central Italy Plans to Use Volcano to Generate Power

Railroads in central Italy are to be operated with electric power produced by an extinct volcano. London engineers have been invited to collaborate in drawing up a plan for the construction of a large generating plant at Larderello, near the ancient Etruscan city of Volterra, where steam escapes from vents in the ground.

For many years boracic acid was extracted from the steam. Now Prince Giori-Conti is embarking on the ambitious project to use the volcanic energy in the power plant.

•

City Plant Gets Contract

The Shelby County Rural Electrification Co-operative has accepted a rate for electricity offered by the Harlan (Ia.) Municipal Electric Light Plant. The contract is for five years. The cost is about $1,000 per mile and the federal government has allotted $287,500 for the project.

•

Plan Electric Plant

Seaford Power & Light Company, Delaware, subsidiary of Fairbanks, Morse & Company, and the Town Council have entered into an agreement whereby construction of a $194,000 electric power plant will be started in the near future. Contracts are expected to be let soon and the plant will be in operation by September 1, it is said.

•

Marathon Case Settled

Announcement has been made by Nathaniel S. Clark, the regional director for the National Labor Relations Board at Milwaukee, that the Marathon Electric Manufacturing Corporation of Wausau, Wis., has settled a case pending before the board by restoring 33 employees with full seniority rights and restitution for wages lost during the period when they were refused reinstatement. The case is one of the oldest standing before the board. It was begun in December, 1935.

STANDARD FOR SEVERAL WELL KNOWN MAKES OF POTHEADS

ILLINOIS PORCELAIN

© Illinois Porcelain is chosen for quality and dependability by pothead manufacturers just as it is also specified for insulation by a great many manufacturers of other types of electrical equipment.

Perfectly balanced interior stress—homogenity of structure—high dielectric strength—permanence of glaze—you get all of these features in Illinois Porcelain.

ILLINOIS ELECTRIC PORCELAIN COMPANY
MACOMB, ILL.

1937 EDITION

Detailed Data on The Light and Power Industry *at Your Finger Tips*

McGRAW CENTRAL STATION DIRECTORY

CONTENTS

Names and addresses of independently owned electric light and power companies in the United States, Canada and United States Possessions.

Names and addresses of municipally owned electric light and power systems in the United States, Canada and United States Possessions.

Names and addresses of affiliated, holding, controlling or managing companies with complete lists of properties controlled or managed by each.

Names and addresses of principal officials of holding and managing companies.

Names and addresses of officials and chief operating men for all operating companies including:

Presidents
Vice Presidents
General Managers
Chief Engineers
Electrical Engineers
Mechanical Engineers
General Superintendents
Plant Superintendents
Plant Engineers
Superintendents of Distribution
Superintendents of Transmission
Commercial or New Business Managers
Merchandising Managers
Purchasing Agents
Division or District Managers
Division or District Superintendents
Division Merchandising Managers

For each operating company the following information is presented:

Generator Capacity in kva. or kw.
Kind of Prime Mover and Capacity in hp.
Amount of power purchased in kw.-hrs.
Type of current distributed, number of wires, phase and cycles.
Number of meters served.
Location of power plants.
Location of districts or divisions.
Complete list of towns (having a population of 500 and over) served.

National and State Public Utility Commissions with addresses, names of commissioners and principal assistants.

A complete alphabetical index of companies and municipal systems giving location by city and state.

All the information you need to intelligently contact this field

READY NOW

The McGraw Central Station Directory gives complete information on the organized agencies which furnish electric light and power service to communities of 500 or greater population in the United States, Canada and United States Possessions.

It lists all operating and holding companies, arranged alphabetically according to cities and states, together with the names and titles of operating officials and other executives, names of the cities served by each company, capacity and location of plants, amount of power purchased, type of current distributed, number of meters served.

National and State Commissions are also listed, together with their commissioners and principal assistants.

More than 800 pages—handy size—4½″ x 8½″—printed in clear readable type—bound in flexible covers that resist hardest usage — fully thumb-indexed by states. Price $25.00 per copy with 10% discount on orders for 5 copies or more.

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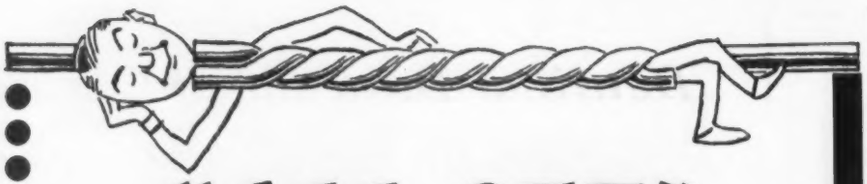


"ALL SET"

FOR A LONG PULL

It is not only the long span rural lines that are standing the poles farther apart than ever before—all types of construction are calling on wires and twisting sleeves to do a harder job than ever before.

Wolverine High Conductivity Copper Twisting Sleeves are made in one factory (one of the most modern tube mills in America) where attention to fine details in the manufacture of any size twisting sleeve is all a part of the day's work.

Wolverine makes all single and double tube Seamless Copper Sleeves to specifications passed by an N.E.L.A. Committee. They are uniform in accurate size, soft temper for easy twisting. After twisting, they harden on the cable with a corrosion-proof, moisture-proof, tension-resisting grip.

WOLVERINE TUBE COMPANY

1411 Central, Detroit • Sales Offices in Major Cities

WHEN WE SAY . . . WE MEAN POLES

And in a big way, with ample stocks ready for shipment, correctly graded and certified Dense Long Leaf Yellow Pine.

¶ With extensive resources in standing timber, we control all factors from tree to car, branding each pole for your protection with the name

DIXIE

For quotations, address:

JACKSON LUMBER CO.

MANUFACTURERS

LOCKHART, ALABAMA

A CROSSETT WATZEK GATES INDUSTRY

Sales Opportunities

WEST HARTFORD, CONN.—Hartford Electric Light Company, Hartford, has plans for new indoor-type power substation on Albany Avenue, near North Main Street, West Hartford, and will begin work soon.

LUFKIN, TEX.—Southland Paper Mills, Inc., recently organized, care of E. J. Jurth, president Angelina County Lumber Company, Lufkin, company official, plans installation of motors and controls, conveyors, regulators, switchgear, electric hoists and other equipment in proposed new pulp and paper mill on local site, now being acquired, for newsprint production. A power plant will be built. Plant will have capacity of close to 11,000 tons of newsprint monthly and will cost close to $5,000,000. It is understood that plans will be drawn by George F. Hardy, 305 Broadway, New York, N. Y., mill engineer.

SIMMS, MONT.—Sun River Electrification Association, Simms, S. F. Hockersmith, president, receives bids until June 11 for primary and secondary lines for rural electrification system in parts of Cascade and Teton Counties, totaling about 105 miles, with power substations and service facilities. Cost approximately $100,000. J. M. Garrison, State Water Conservation Board, Helena, Mont., is engineer, in charge.

CLEVELAND, OHIO — Braden-Sutphin Ink Company, 1736 East Twenty-second Street, plans installation of motors and controls, regulators, conveyors and other equipment in new three-story and basement plant on Chester Avenue, N. E., for which superstructure will begin soon. Cost about $130,000.

READING, PA.—Metropolitan Edison Company has plans under way for addition to steam-electric generating plant at West Reading, including installation of new 25,000-kw. turbo-generator unit and auxiliary equipment, high-pressure boilers and complete accessories, increasing capacity to 97,000 kw. Distribution division will be expanded with installation of new switchgear, switchboards, transformers and auxiliary equipment. Transmission lines will be extended, as well as distributing lines in different districts. Entire project is scheduled for completion and will cost close to $3,000,000. Company is a unit of Associated Gas & Electric Company, New York, N. Y.

BRYAN, TEX.—Plans primary and secondary lines for rural electrification in districts in extensive radius from city, including points in Brazos, Robertson and Burleson Counties, totaling close to 250 miles in all, with outdoor power substations and service facilities. Power supply will be secured from municipal power station. Cost close to $250,000, of which approximately $200,000 will be secured through Federal loan, R. G. Williamson is city manager.

LOS ANGELES, CALIF.—Metropolitan Water District, 306 West Third Street, receives bids until June 29 for electric control equipment and control boards for five main pumping plants on Colorado River Aqueduct, known as Intake, Gene, Iron Mountain, Eagle Mountain and Hayfield Stations, respectively (Specifications 208).

COLORADO SPRINGS, COLO.—Holly Sugar Corporation, Colorado Springs, plans installation of motors and controls, regulators, conveyors, loaders and other equipment in new beet sugar mill at Hardin, Mont., where site was secured a number of months ago. A power house will be built. Company has

authorized fund of about $2,000,000 for this mill and extensions and improvements in other mills, including plant at Alvarado, Calif., during present year.

DENVER, COLO.—Bureau of Reclamation, Custom House, receives bids until June 14 for four 3,333-kva., single-phase, 60-cycle, 16,500 to 39,840/69,000-Y-volt transformers of load-ratio-control type; one 138,000-volt, three-phase, 60-cycle, 600-amp. oil circuit breaker; one-three pole, 69,000-volt lightning arrester; three 138,000-volt and one 16,500-volt disconnecting switches, and two 16,500-volt and one 39,600-volt potential transformers, all for installation in Boulder power plant, Boulder Canyon Project, Arizona-California-Nevada (Specifications 727); also, until June 21 for main control equipment, 250-volt d.c. distribution switchboards and 460-volt and miscellaneous a.c. control equipment for control of two main generating units (N-5 and N-6), in Boulder power plant, project noted (Specifications 736). Equipment in both cases will be installed by Government.

HUNTLEY, MONT.—Yellowstone Valley Electrification Association, Huntley, J. E. Pickens, president, receives bids until June 8 for primary and secondary lines for rural electrification system in parts of Yellowstone County, totaling about 135 miles, with power substation and service facilities. Cost about $155,000. Financing has been arranged through Federal aid. J. M. Garrison, State Water Conservation Board, Capitol Building, Helena, Mont., is engineer, in charge.

KENOSHA, WIS.—Nash Motors Division, Nash-Kelvinator Corporation, plans installation of motors and controls, conveyors, electric hoists, regulators and other equipment in connection with expansion and modernization of automobile plants at Kenosha, Racine and Milwaukee, Wis. Entire project will cost close to $1,500,000 and will be carried out during summer.

MADISON, WIS.—Madison Gas & Electric Company has plans maturing for extensions and improvements in local steam-electric generating plant, including additions to generator building, boiler plant and other divisions, with installation of new turbo-generator unit and accessories, estimated to cost $650,000; new high-pressure boiler units and auxiliary equipment, to cost about $500,000; transformers, bus structures, switchboards, instruments, conductors and other installation. Entire project will cost about $1,400,000. Mead, Ward & Hunt, State Journal Building, Madison, are consulting engineers.

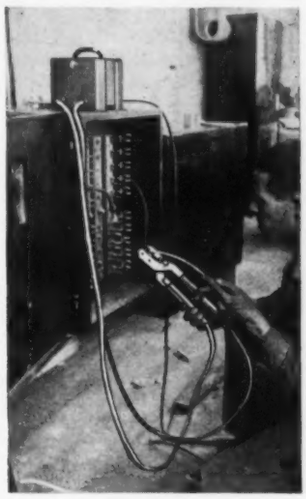
JESSUP, ARK.—Arkansas-Missouri Power Company, Blytheville, Ark., plans extensions in primary and secondary lines for rural electrification in parts of Lawrence County, to furnish service at Jessup, Lynn, Denton, Smithville and other points, totaling about 26 miles in all, with outdoor power substation and service facilities. Permission has been secured.

BROOKLYN, N. Y.—Bureau of Supplies and Accounts, Navy Department, Washington, D. C., receives bids until June 8 for turbo-generator sets, Diesel engine-generator sets, distribution switchboards and accessory equipment for Brooklyn Navy Yard (Schedule 751).

READING, PA.—Has engaged Burns & McDonnell Engineering Company, 107 West Linwood Boulevard, Kansas City, Mo., consulting engineer, to make surveys and estimates of cost for proposed municipal electric power plant and distribution system. (Tentative costs of project total over $2,500,000).

PUBLIC UTILITIES and INDUSTRIALS
USE AND ENDORSE THIS NEW TOOL

IDEAL Thermo-Grip Pliers



CUT OUT FIRE HAZARDS!

For soldering work, applying or removing wire connectors, solder lugs and stator tap connections, sweating copper pipes and fittings, etc. No open flame. *Doesn't burn insulation.*

Safety—Holds work and applies heat on both sides at same time. Controlled heat is concentrated on spot where needed. Plug into any A.C. current. Uses current only when in use and in contact with the metal. No eye strain — no goggles necessary. Easy to use.

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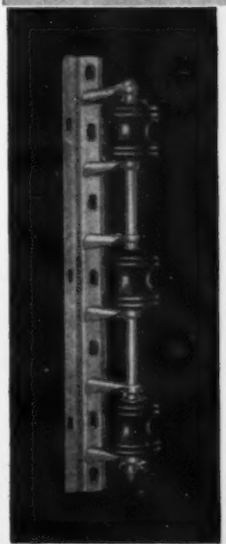
IDEAL COMMUTATOR DRESSER COMPANY
1021 PARK AVE. SYCAMORE, ILLINOIS

OLIVER
POLE LINE MATERIAL
A good specification - always!



OLIVER
PRESSED STEEL SECONDARY RACKS COMBINE LIGHTNESS WITH AMPLE STRENGTH

Oliver Pressed Steel Racks have greater uniform strength for side and dead end loads than any other rack of its type—one of the several reasons for their widespread preference throughout the electrical industry.

OLIVER IRON AND STEEL CORPORATION
PITTSBURGH, PENNSYLVANIA

OLIVER POLE LINE MATERIALS
APPROVED AND ACCEPTED SINCE 1894
OLIVER

BUDA-HUBRON POLE HOLE DRILLS

TRUCK, TRAILER OR TRACTOR MOUNTINGS

Ideal for replacement work as well as new construction

MAINTENANCE COST IS AMAZINGLY LOW *Because*—

1. The drill head is absolutely dust-proof. Lifting mechanism is entirely separate from drilling mechanism. Exceptionally heavy gearing. Simple in design.
2. Spare parts cost so little. The total cost of all parts necessary to build a Buda-Hubron Drill is only 10% more than the cost of a complete machine.

Hundreds of owners are profiting by these economies. You, too, can "cash in" on a dividend paying Buda-Hubron Drill. Send for Bulletin No. 868-2.

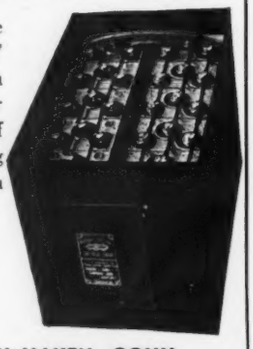
Buda-Hubron Pole Hole Drills are in use in 41 states—13 foreign countries.

THE BUDA COMPANY

Harvey (Chicago Suburb) Illinois

Why buy current you cannot use?

Besides the current actually driving your machines, you are billed now, or eventually will be, for the "magnetizing current" present in your motors and other inductive equipment which *yields no power!* National Capacitors, installed individually or at distribution centers, immediately rectify this, and write off their cost over and over again. All fully explained in "Cutting Costs with Capacitors," a book free when requested.



National CAPACITORS

THE NATIONAL ELECTRIC CONDENSER CO., NEW HAVEN, CONN.

Municipal Plants

WALHALLA, N. D.—Legal proceedings to halt the construction of a municipal light, heat and power plant or the issuance or sale of any bonds for that purpose have been begun in U. S. District Court at Fargo by the Otter Tail Power Company. Citizens in a special election recently voted in favor of the project.

WAPAKONETA, OHIO—Ohio Supreme Court dismissed all appeals in a taxpayer's suit to prevent construction of a municipal light plant as a PWA project. William Priest had sought to prevent issuance of $104,000 in mortgage revenue bonds to finance the city's share of construction costs. He contended that City Council's action to issue the bonds was illegal, but the Supreme Court upheld Auglaize County courts in ruling against him.

SANDUSKY, OHIO—City Commission has appealed an Appellate Court decision halting construction of the proposed $1,400,000 municipal light plant to the Ohio Supreme Court. The Appellate Court held that the commission had not proceeded properly in the issuing of bonds for the project. The original suit to hold the bond issue invalid was brought by the city solicitor at the request of the Ohio Public Service Company.

COLUMBIA, TENN.—A bill asking for an amendment to the city charter to permit the issuance of bonds up to $300,000 for the erection of a municipal light plant without another vote of the people has been drawn by City Attorney Tom Peebles, Jr., and C. A. Kennedy, city counselor. Mr. Kennedy stated the action was taken pending the decision of Judge Gore on the validity of Chapter 32, Acts of 1935, under which the city last September voted 909 to 439 for the bonds for the project.

JACKSONVILLE, TEX.—Petition signed by more than 200 qualified voters has been submitted to the city commission asking that an election be called for the issuance of $250,000 in revenue warrants to build a municipal light and power plant. The city is served by the Gulf Public Service Company. The petition was referred by the city commission to the city attorney. It is understood an election probably will be called in the next 30 or 60 days.

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Lighting Contract Awarded

Contract for installing a new lighting system for thirteen city blocks in South Milwaukee, Wis., has been awarded by the Common Council to the Clifton Engineering Company, Pontiac, Mich. The contract price is $18,915 and ornamental lighting equipment manufactured by the Line Material Company will be used.

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New British Standard

A new British standard specification has been issued in respect to flexible steel conduit for cable protection and flexible steel tubing to inclose flexible drives which provide for three types of mechanical protection.